



Western Regional
Climate Center



Climate Monitoring in the Mediterranean Coast Network

Kelly T. Redmond

Western Regional Climate Center
Desert Research Institute
Reno Nevada



National Park Service / UCLA Climate Change Workshop
2011 April 27-28
Kerckhoff Hall, UCLA, Los Angeles





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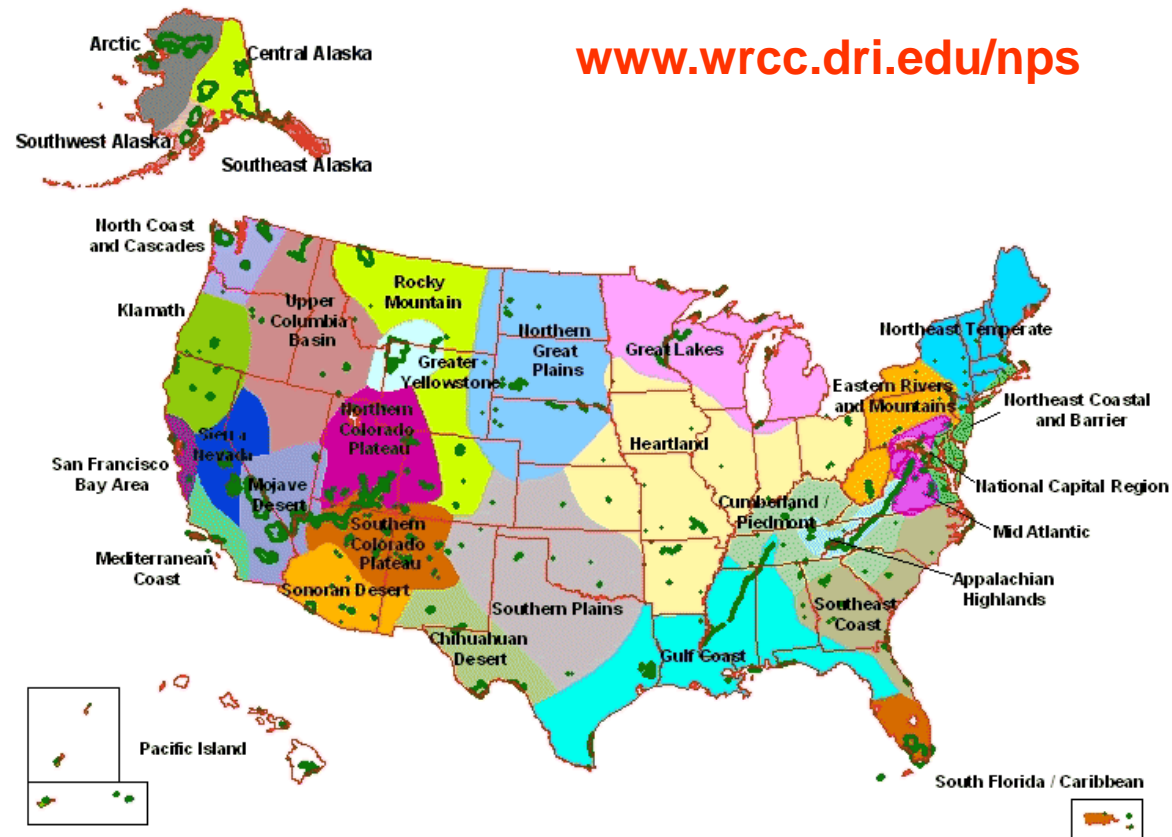
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[Contact Us](#)

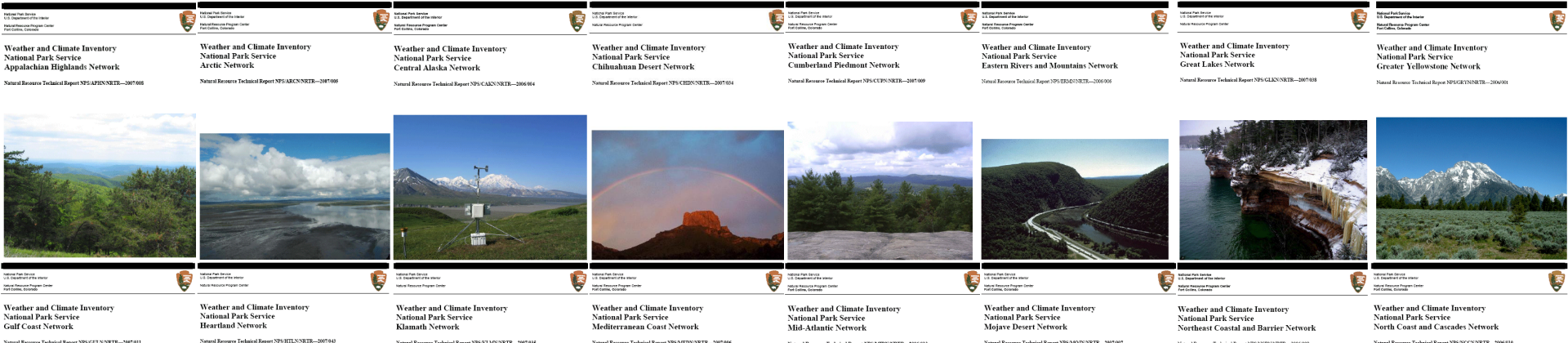
About this site

The purpose of this project is to complete the development of climate data inventories for the National Park Service (NPS) Inventory and Monitoring (I&M) Program. Ultimately one report will be available for each of the 32 networks. This project represents a joint collaboration with the [Western Regional Climate Center \(WRCC\)](#) and the [NPS I&M Program](#). Inventories for some networks have already been completed under other arrangements, and others are partially completed. The project will also provide information on the design of climate observing networks, as well as the development of protocols and advice on various aspects of implementing and maintaining programs of climate observations. A similar [NPS web page](#) for this project can be found [here](#).

The 32 networks are shown on the map below.



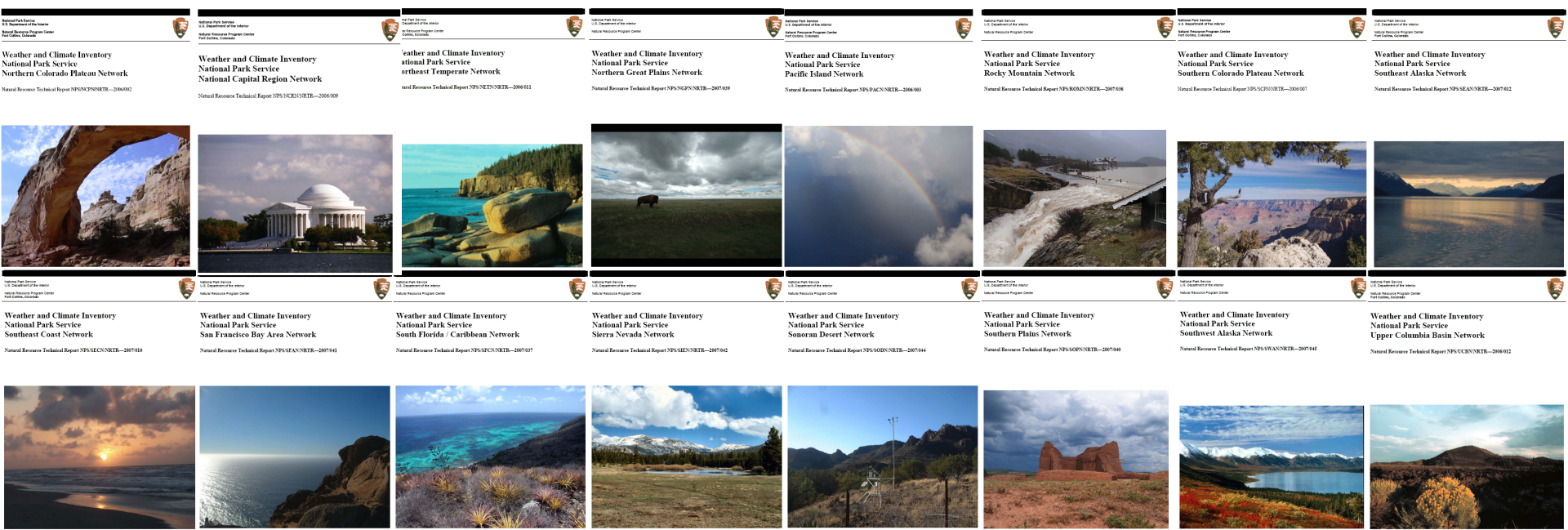
www.wrcc.dri.edu/nps



32 Networks.

32 Climate Inventory Reports.

www.wrcc.dri.edu/nps



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www.wrcc.dri.edu/nps

National Park Service
U.S. Department of the Interior
Natural Resource Program Center
Fort Collins, Colorado

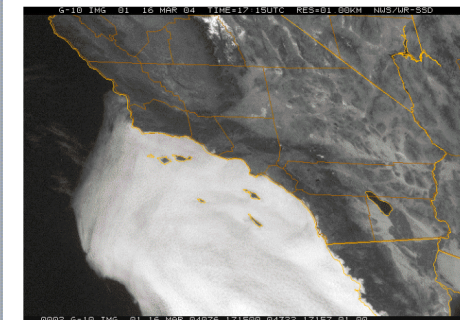


Weather and Climate Inventory National Park Service Mediterranean Coast Network

Natural Resource Technical Report NPS/MEDN/NRTR—2007/006



Channel Islands National Park: Design Considerations for Weather and Climate Monitoring



Kelly Redmond
Greg McCurdy

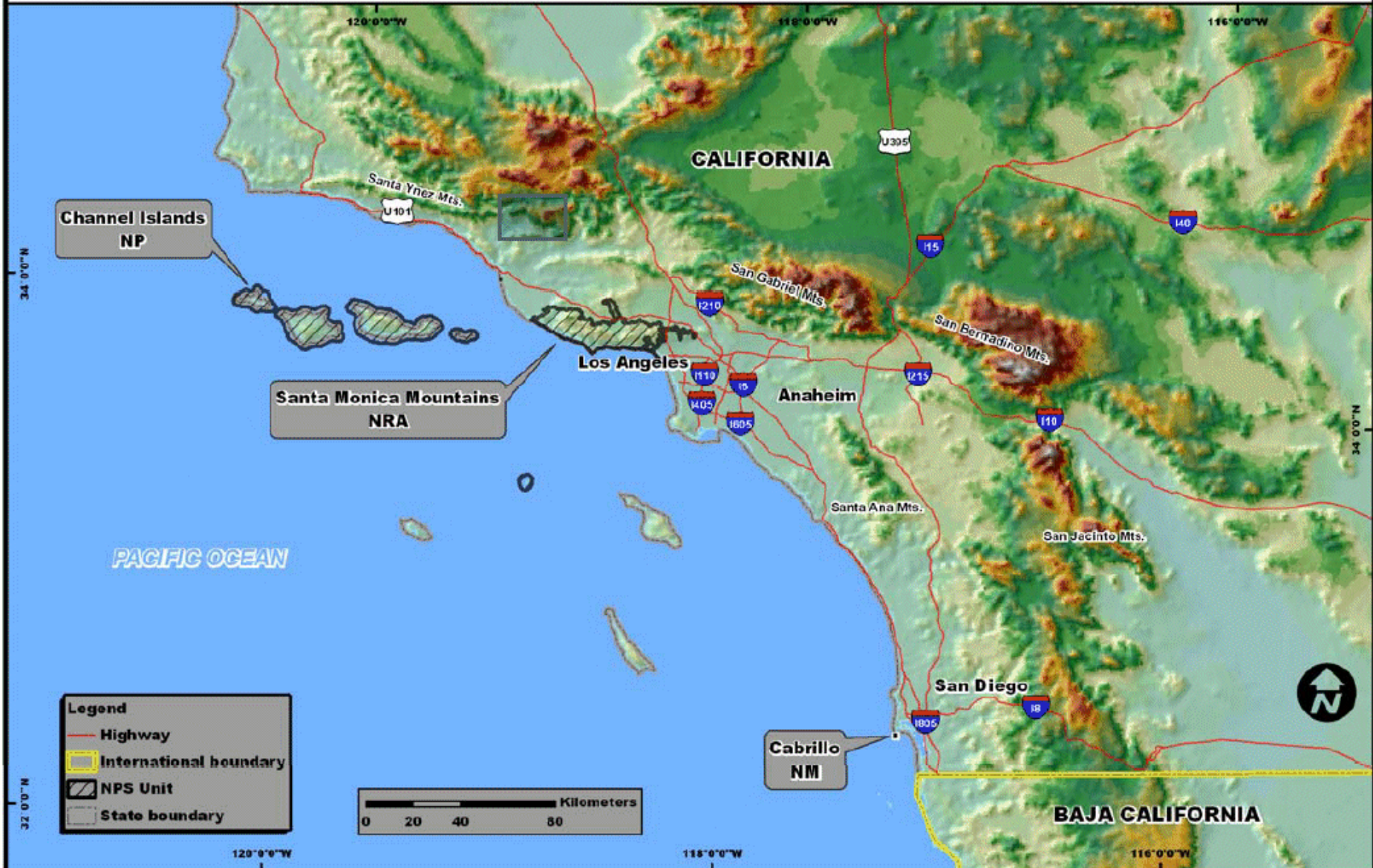
Report WRCC 05-02
July 2005

Western Regional Climate Center
Desert Research Institute
2215 Raggio Parkway
Reno Nevada 89512-1095

[Complete listing of networks and their park units](#) [xls file]

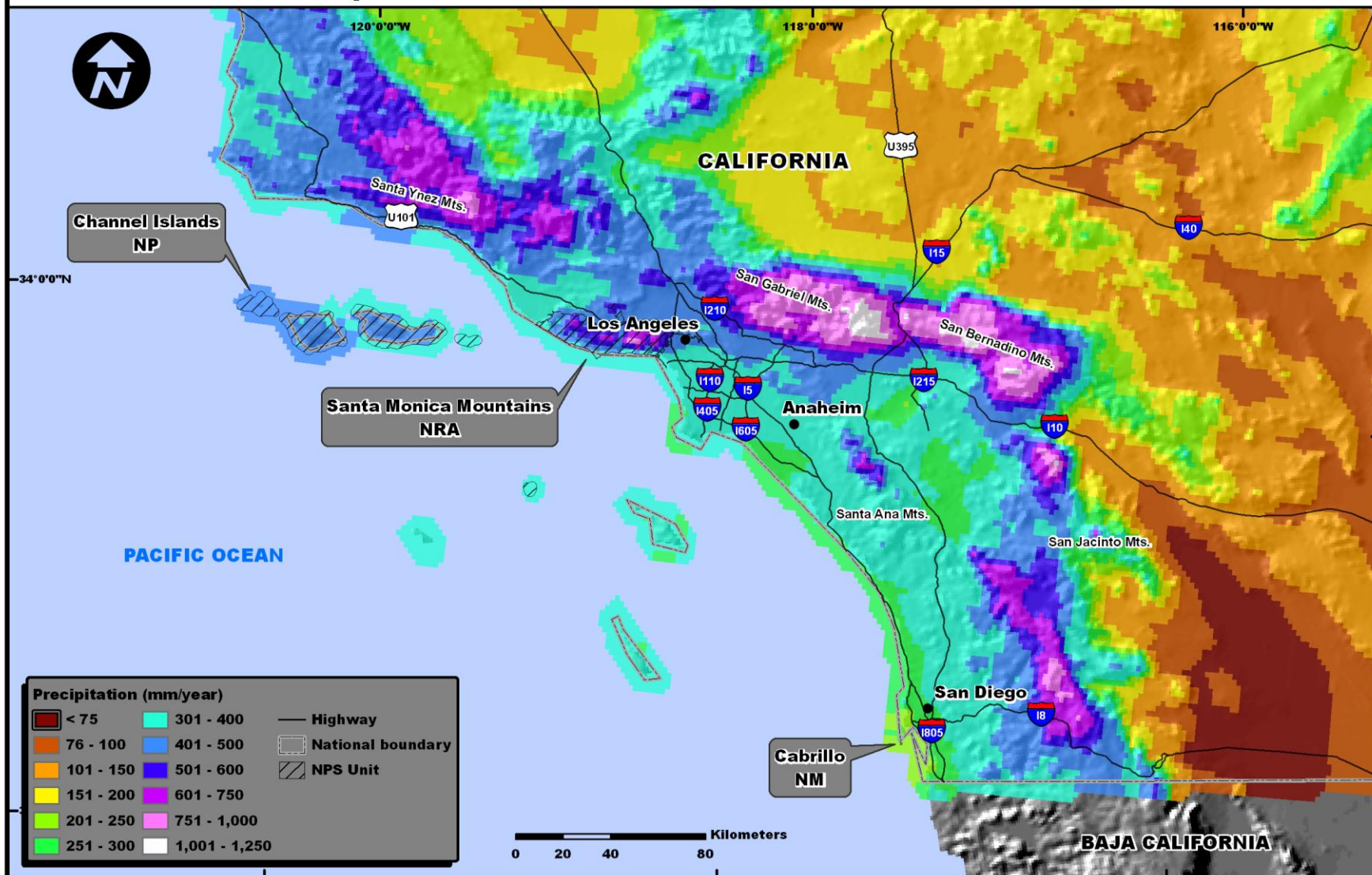


Geographic Location - Mediterranean Network

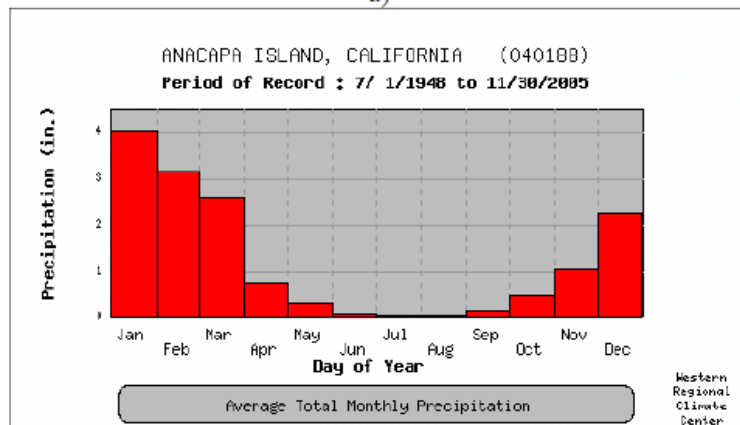




Mean Annual Precipitation



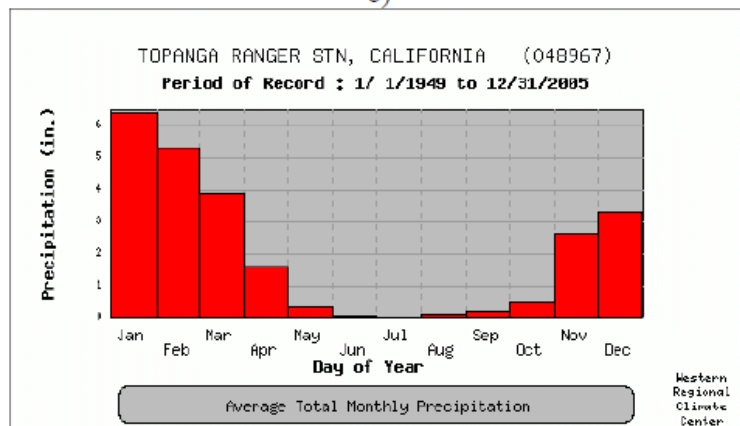
a)



Annual Cycle of monthly Precipitation

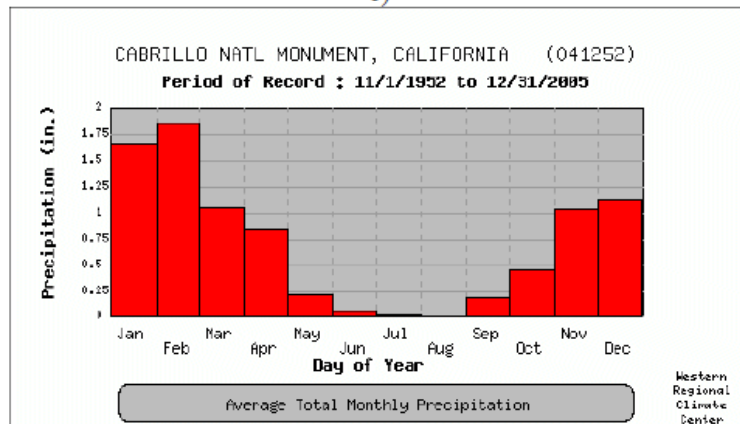
Anacapa Island

b)



Topanga Ranger Station

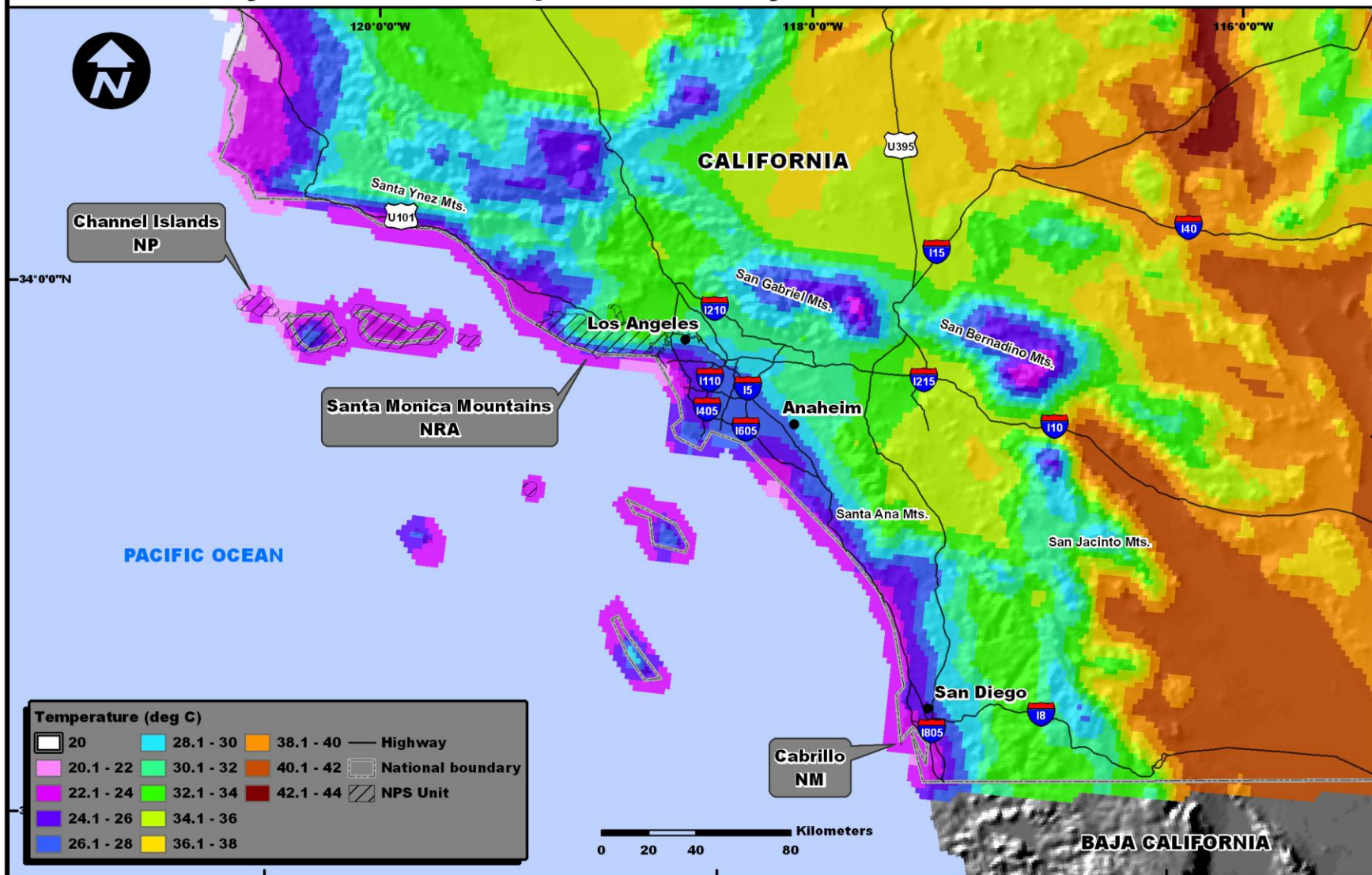
c)



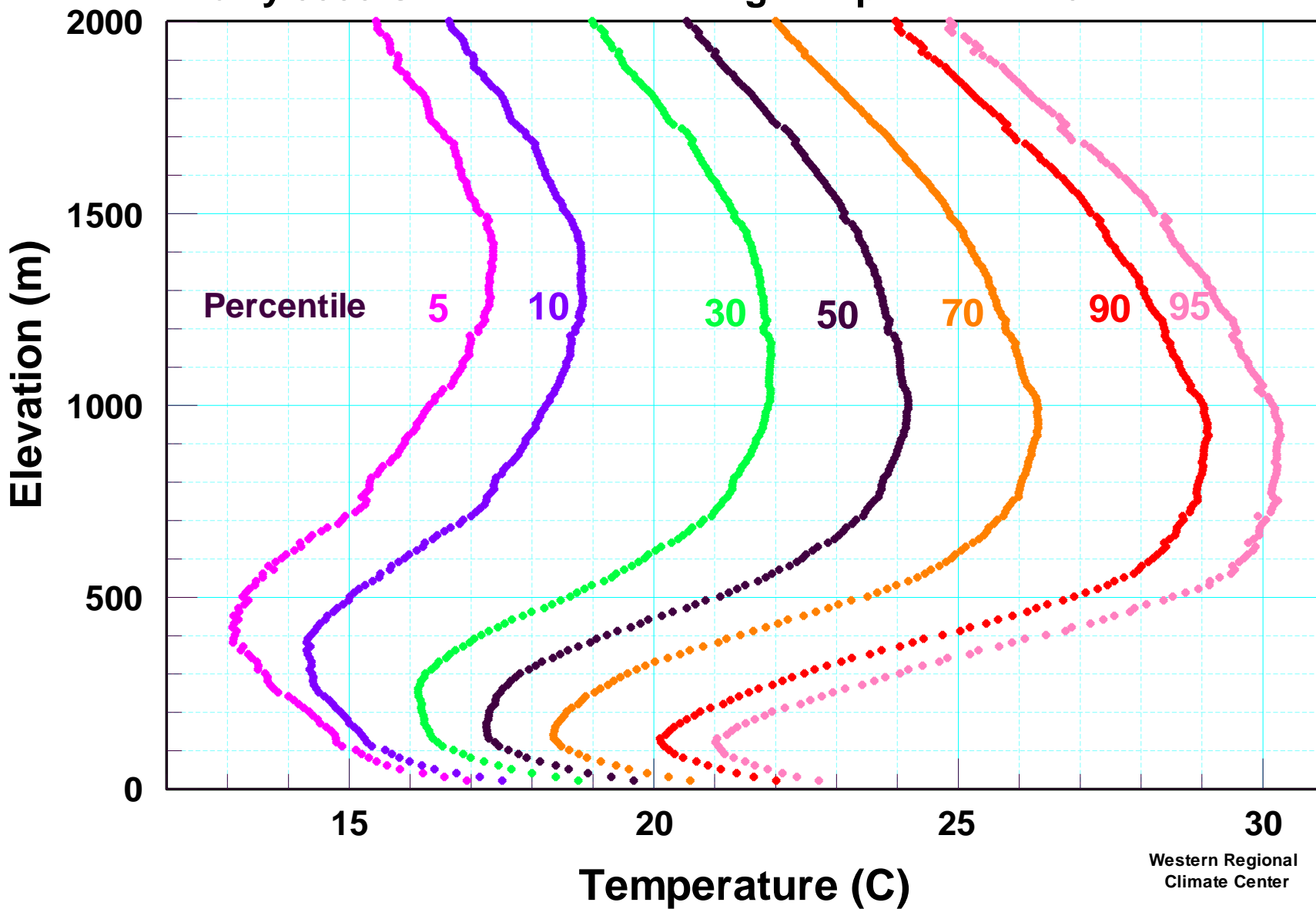
Cabrillo National Monument



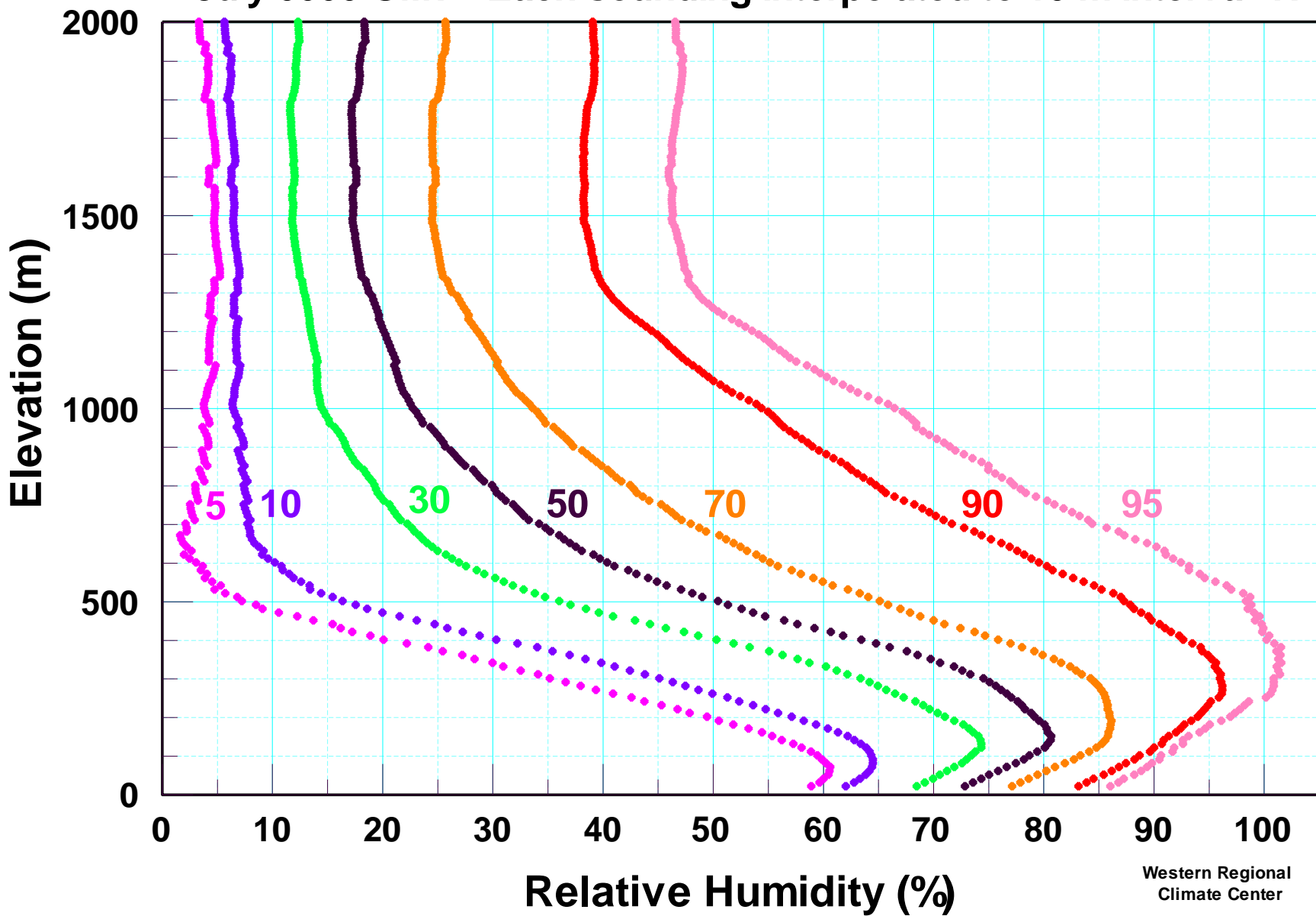
Mean Monthly Maximum Temperature - July



**Big Sur. Vandenberg 1958-1990. Vertical Temperature Profiles.
July 0000 GMT. Each sounding interpolated to 10 m interval. N = 302.**

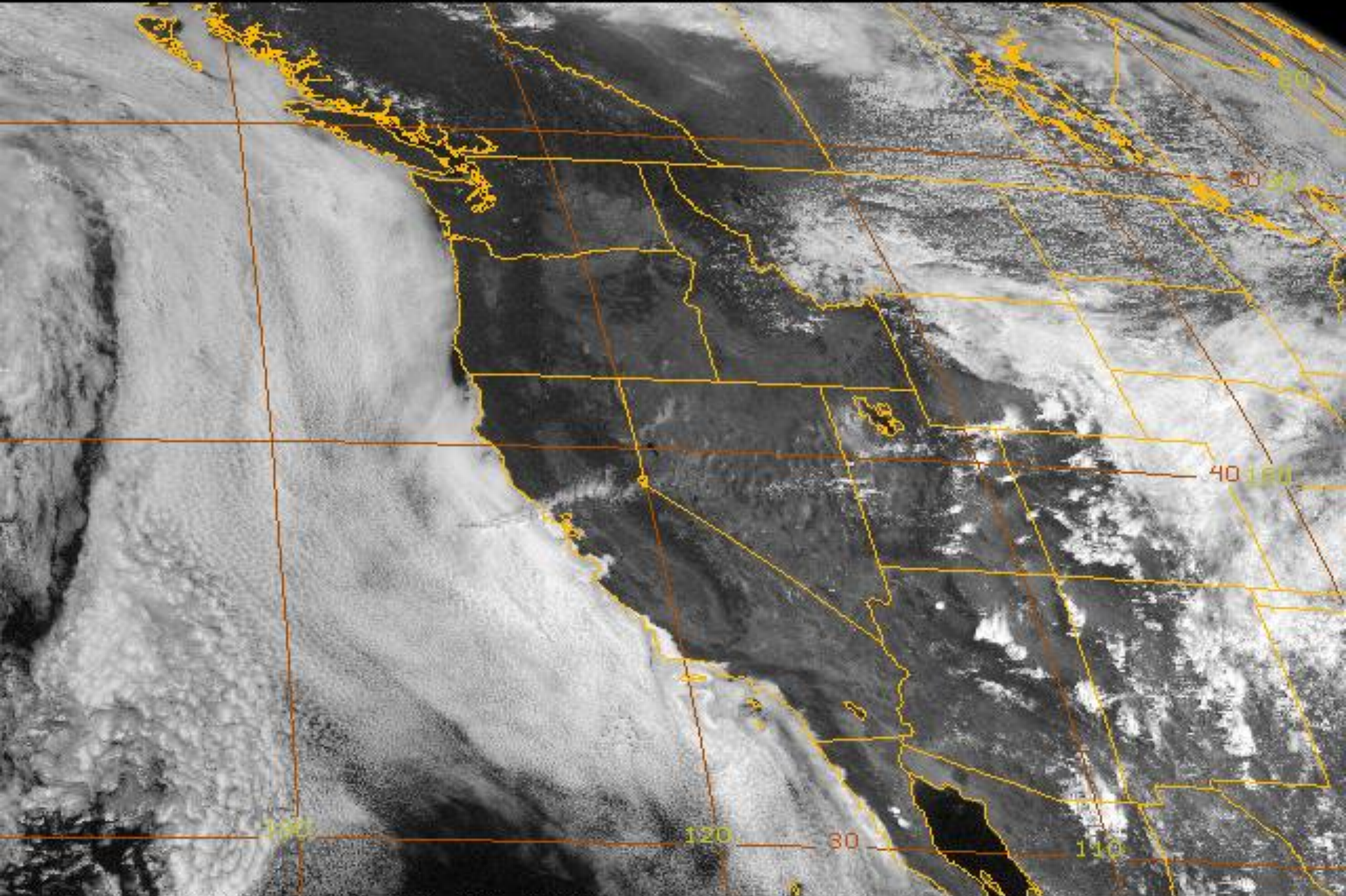


**Big Sur. Vandenberg 1958-1990. Vertical Relative Humidity Profiles.
July 0000 GMT. Each sounding interpolated to 10 m interval. N = 302.**



1900 GMT 13 Aug 2005

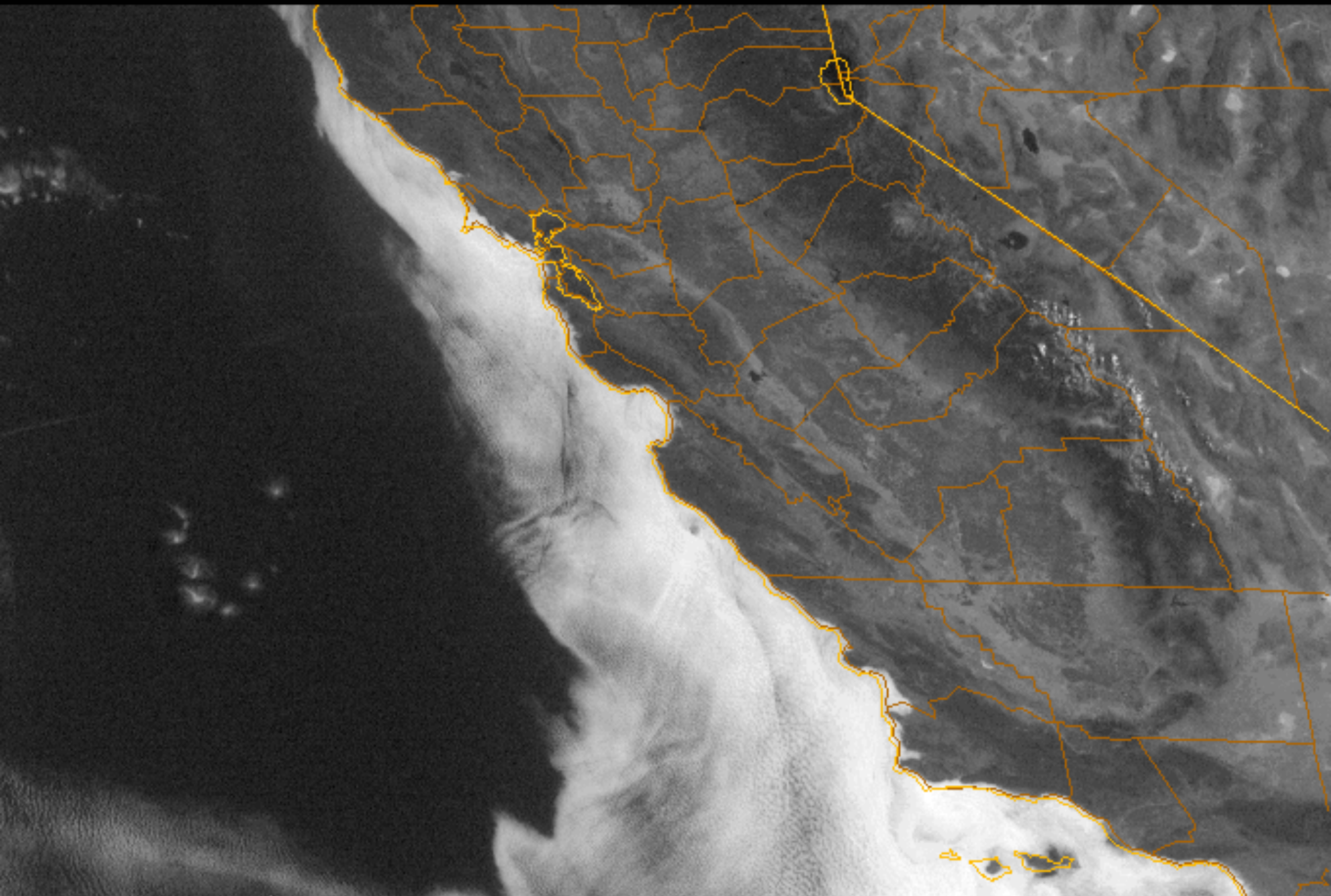
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1700 GMT 11 Aug 2005

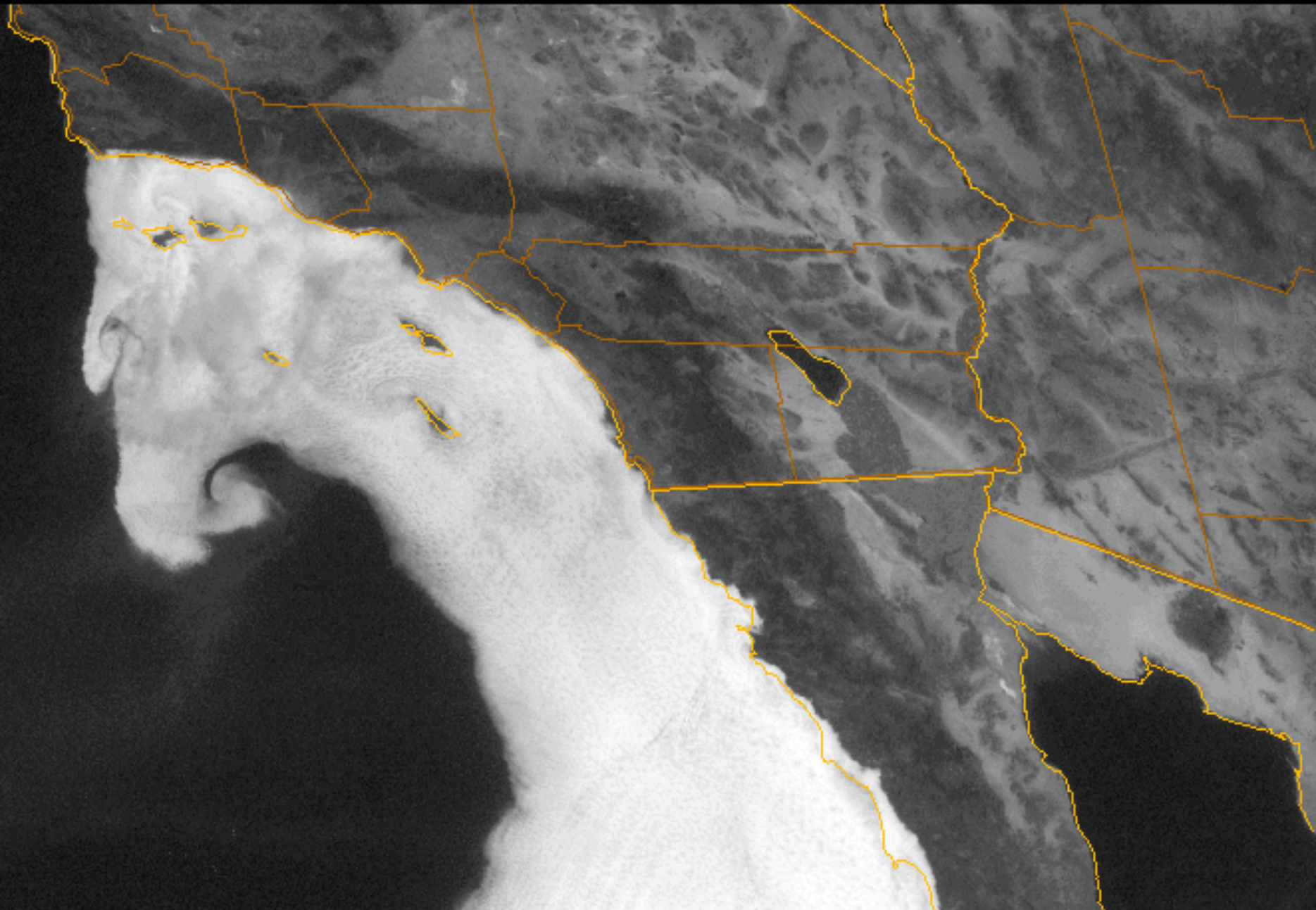
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1630 GMT 06 Jun 2002

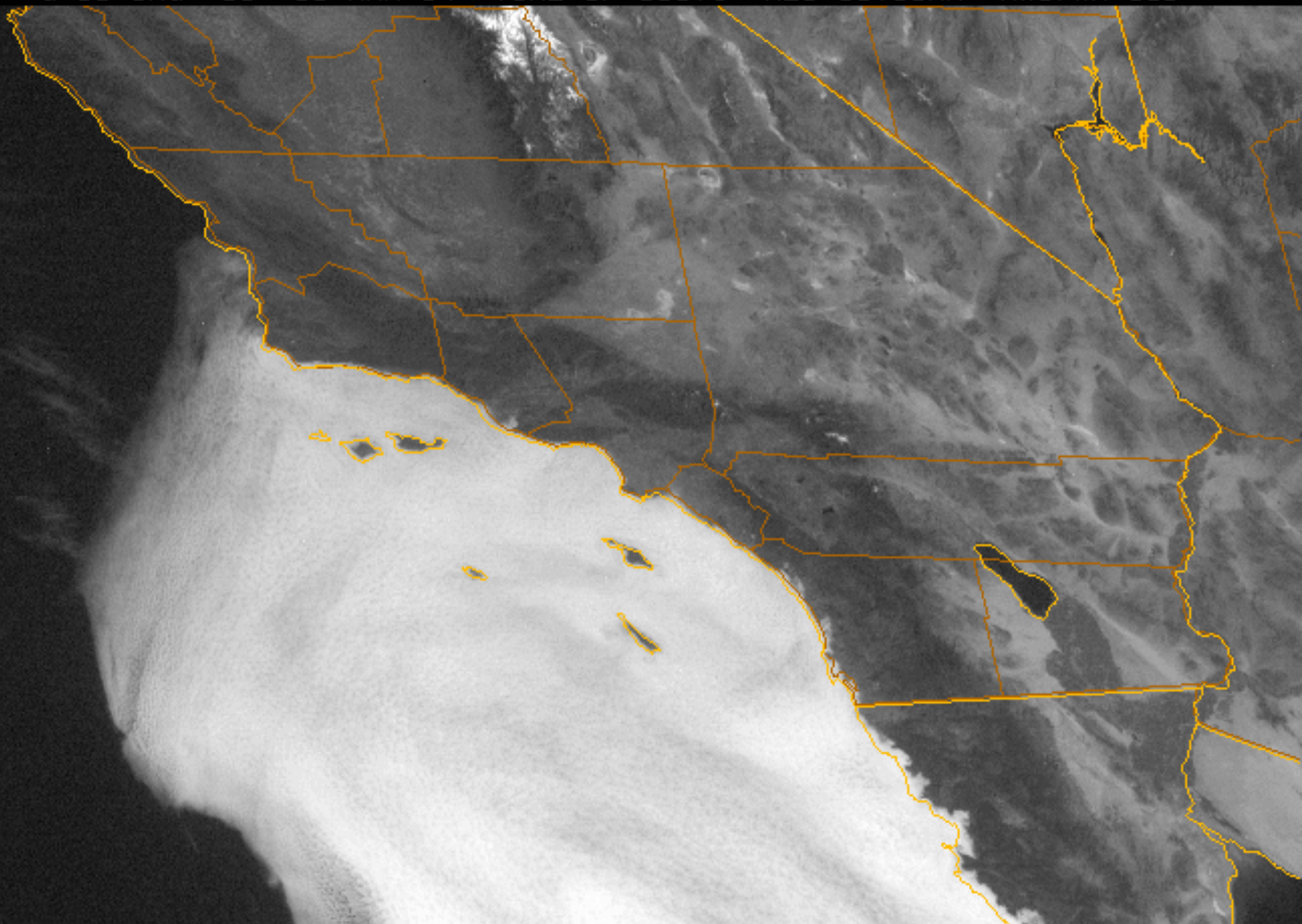
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1715 GMT 16 Mar 2004

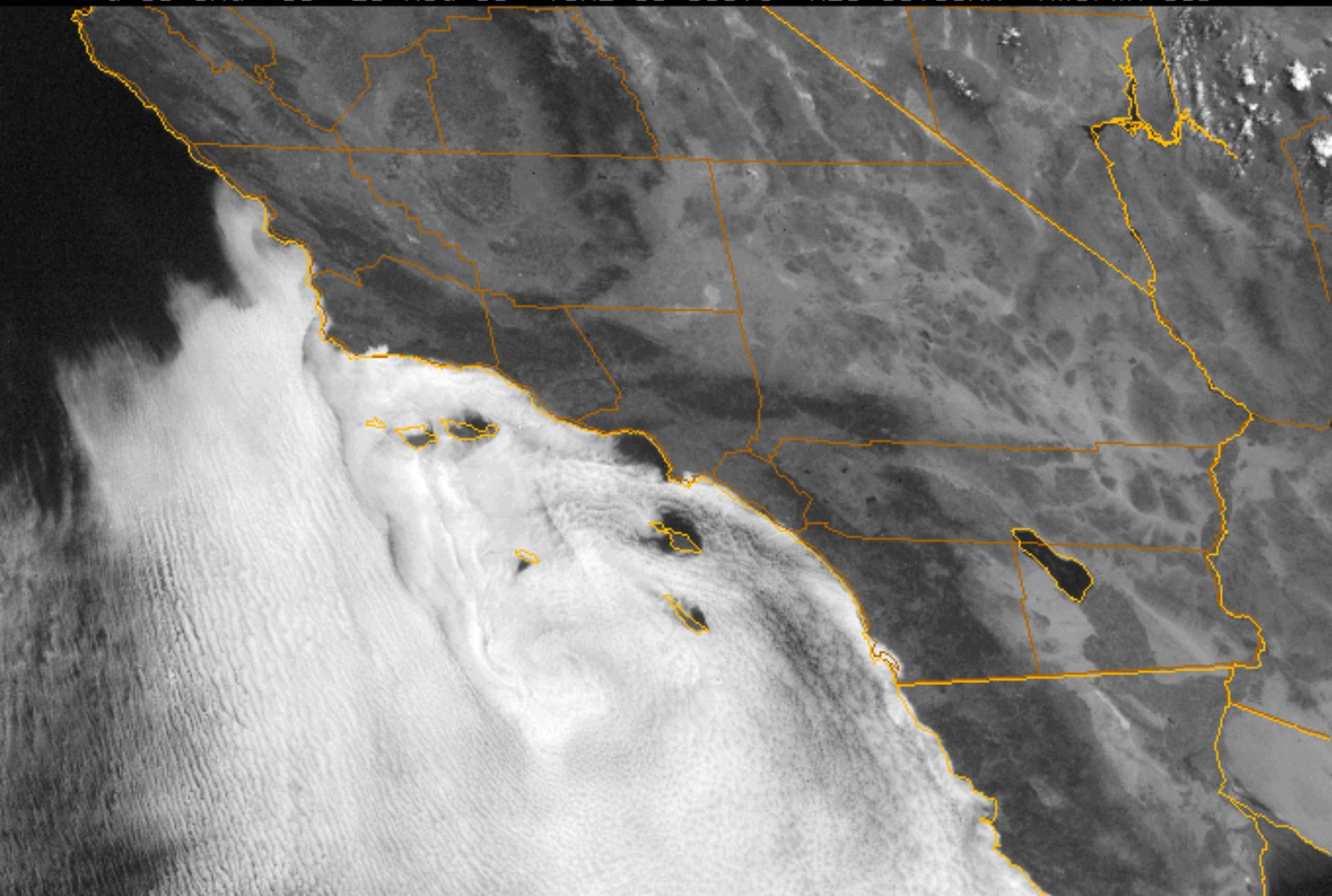
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1830 GMT 28 Aug 2001

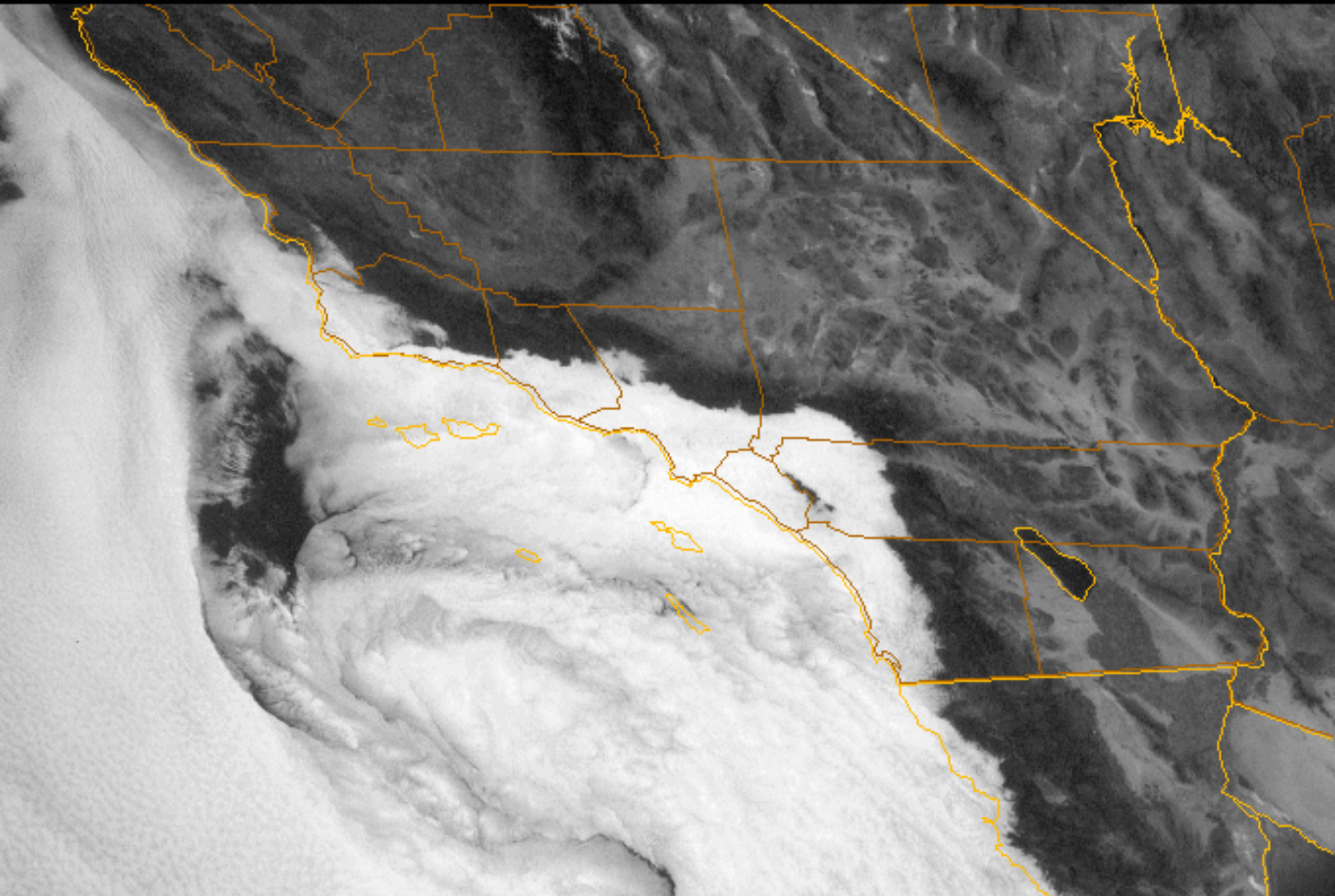
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1530 GMT 11 Jun 2002

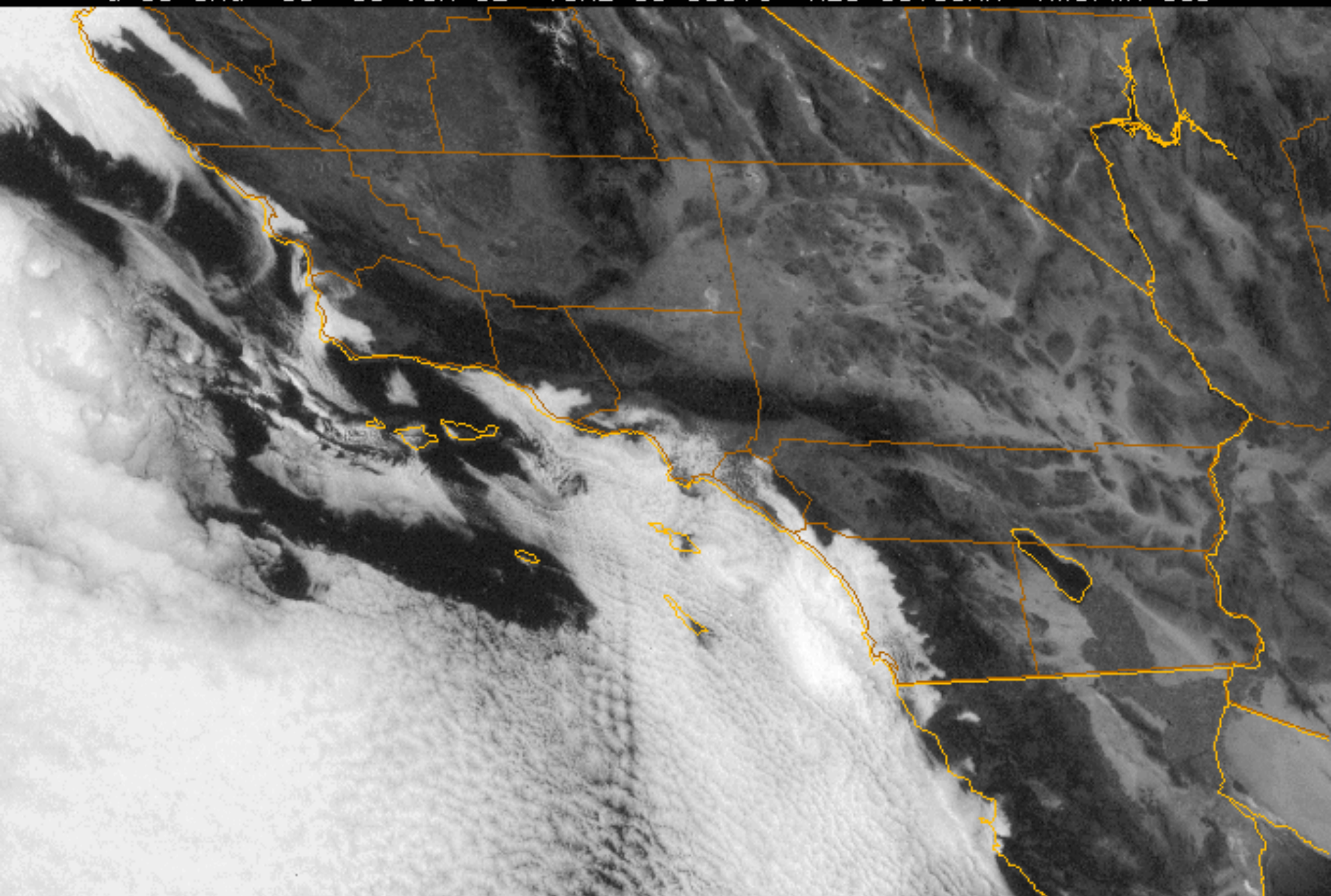
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1530 GMT 13 Jun 2002

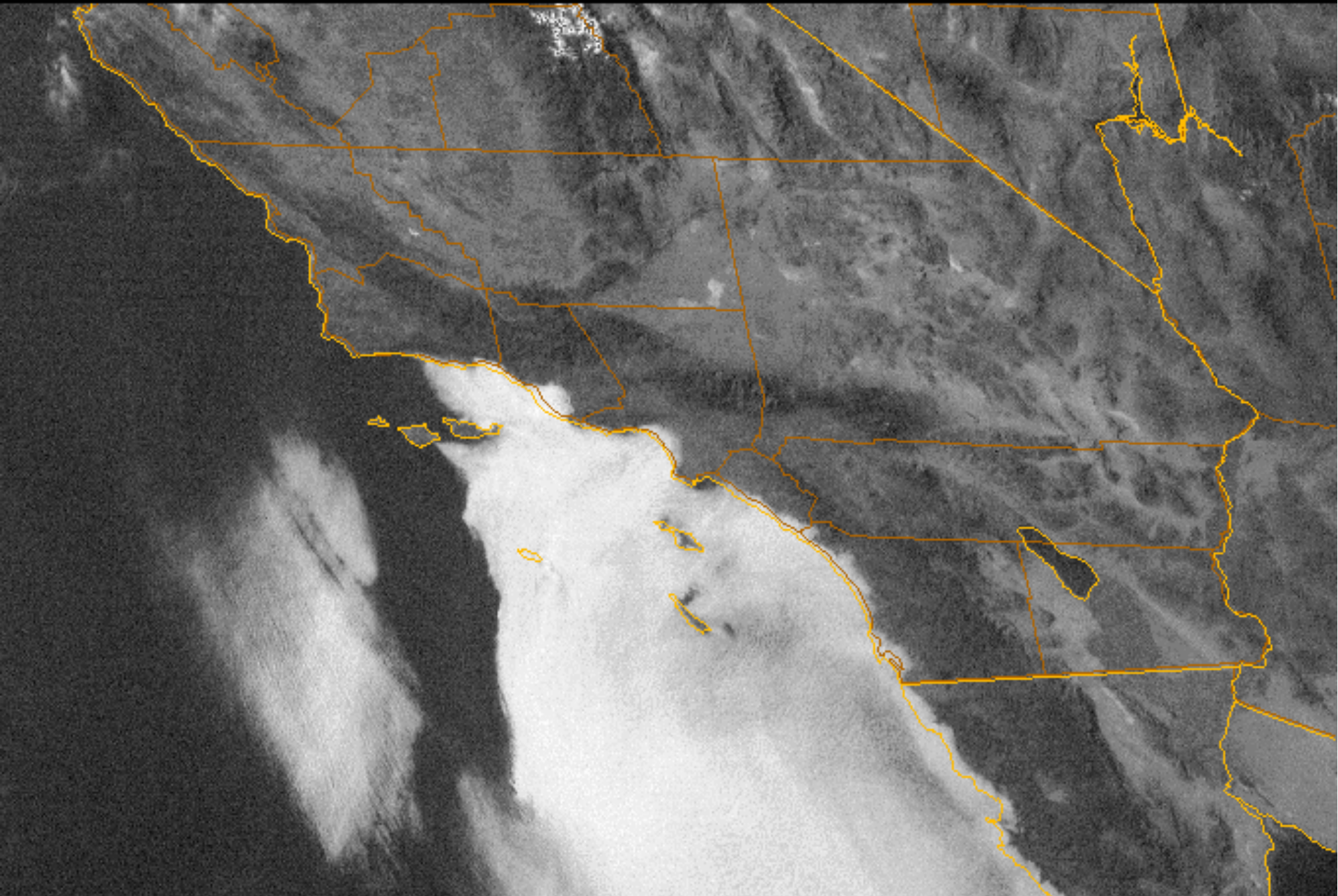
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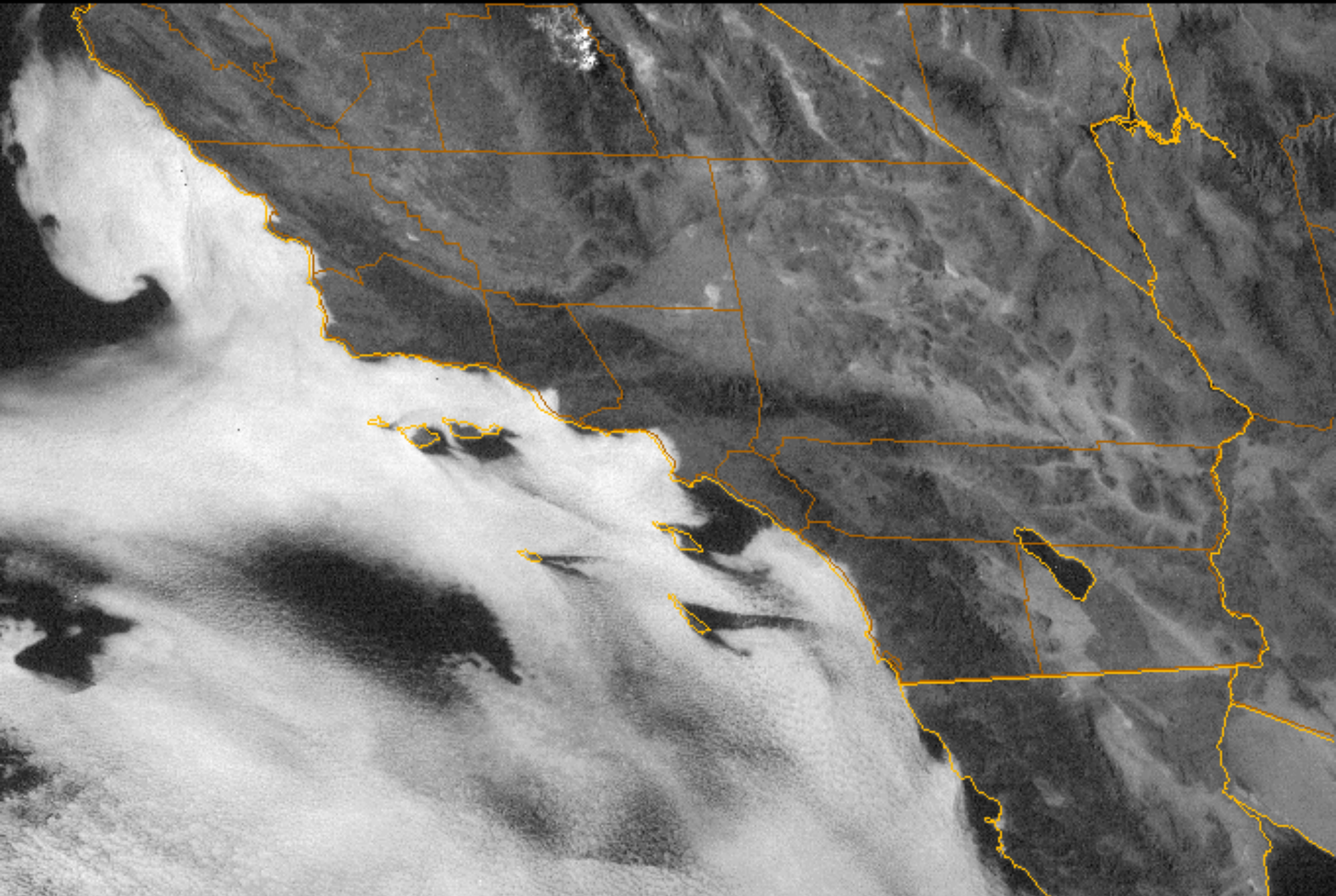
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0115 GMT 28 Jun 2003

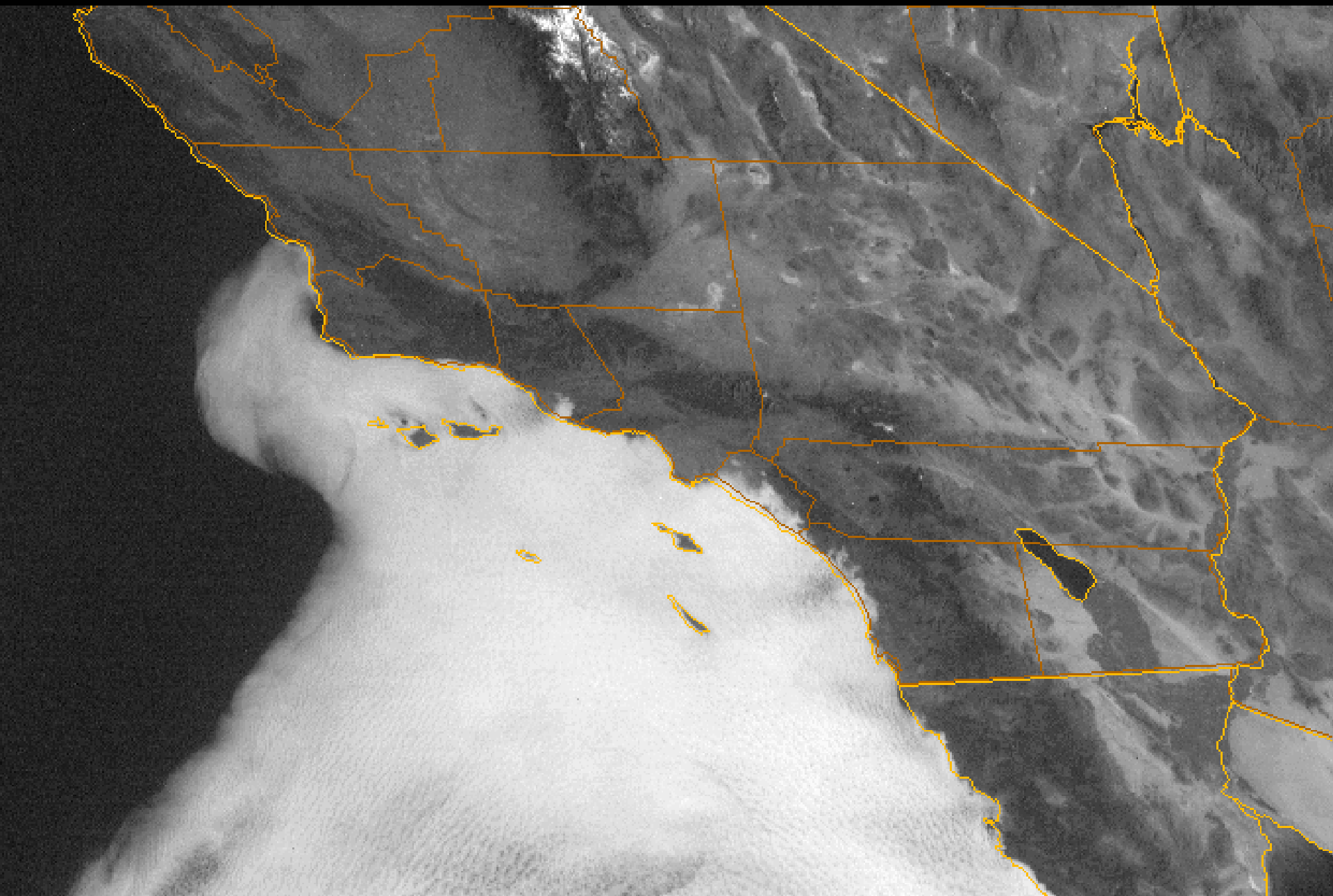
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1630 GMT 17 Mar 2004

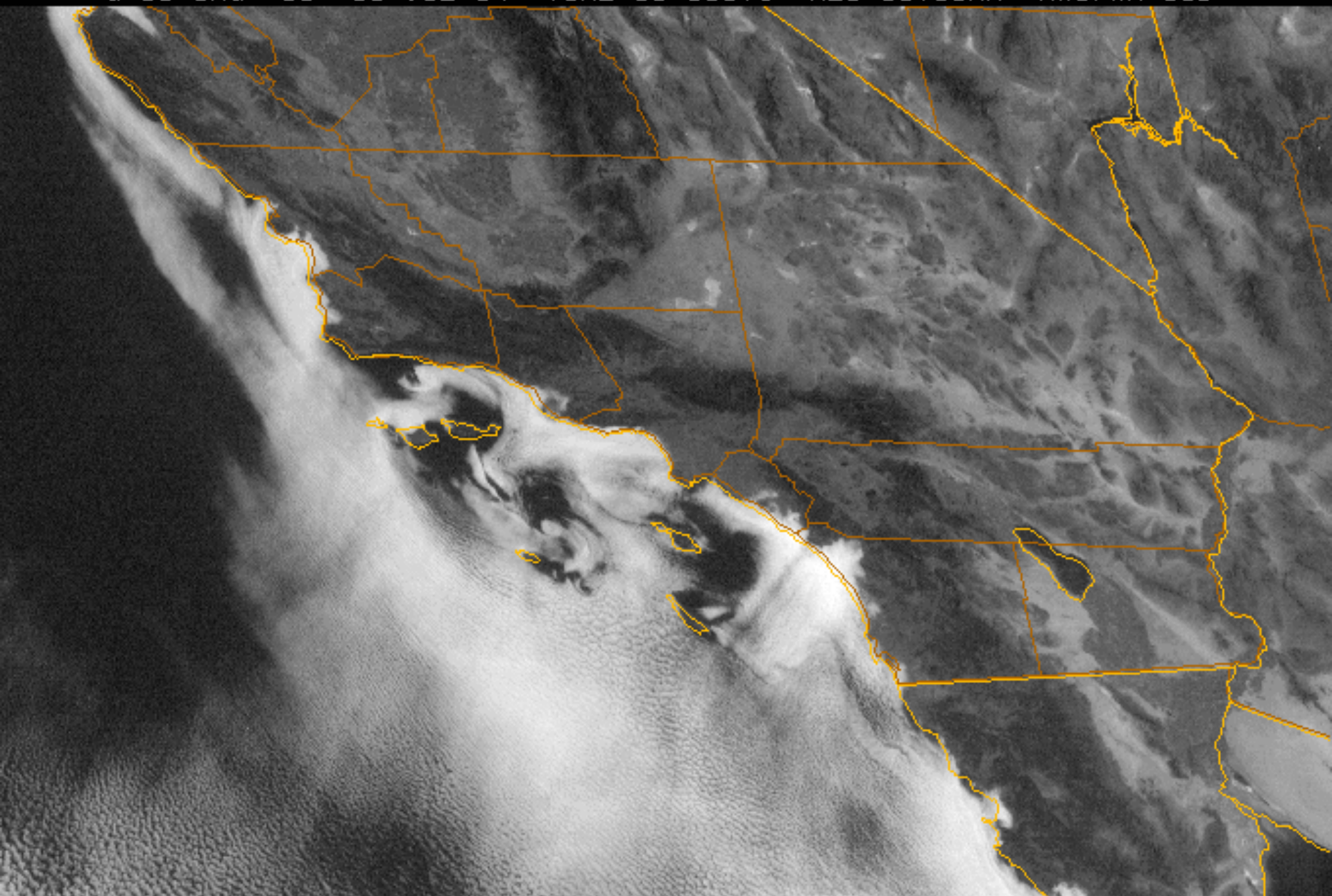
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1530 GMT 11 Jul 2004

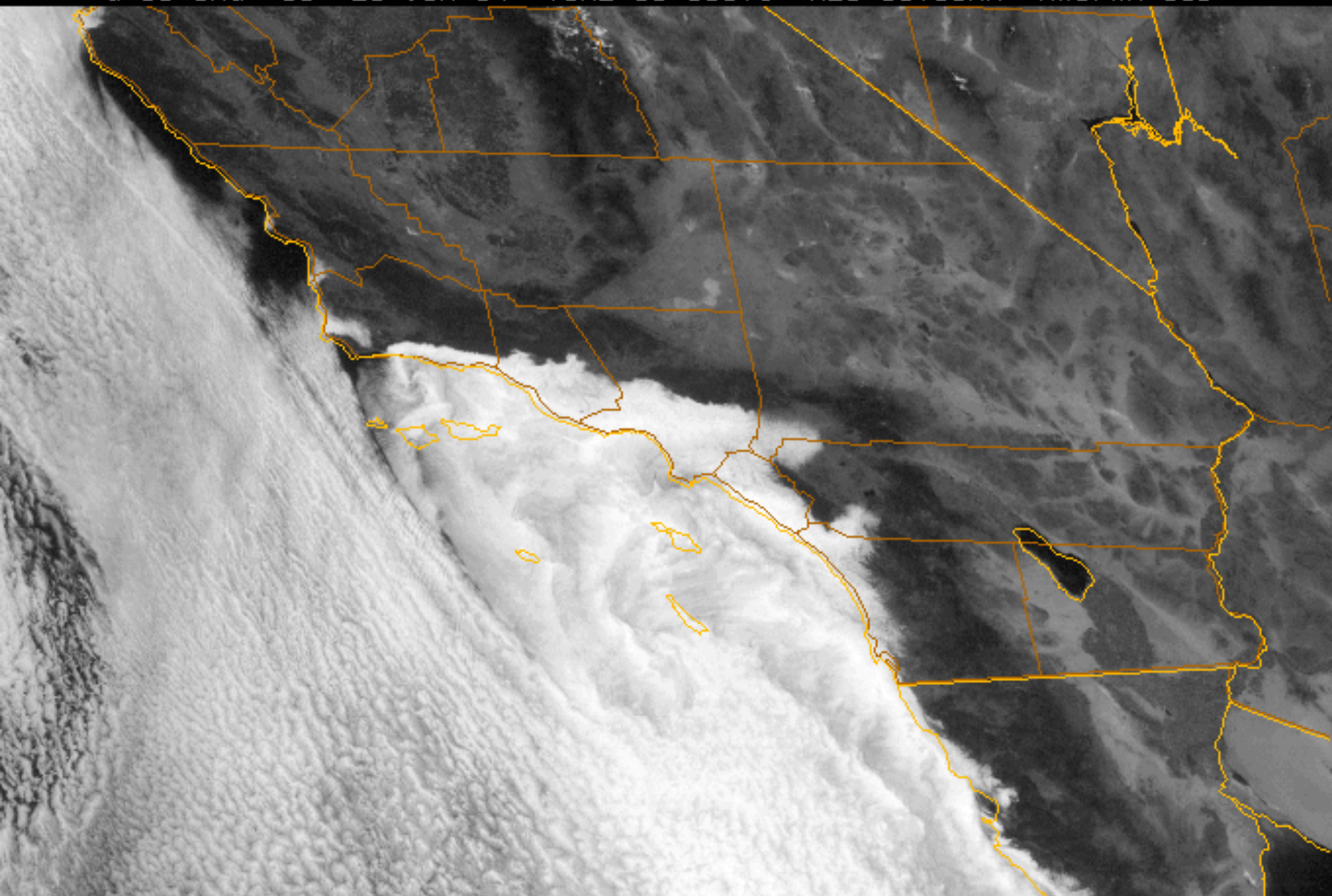
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1800 GMT 21 Jun 2004

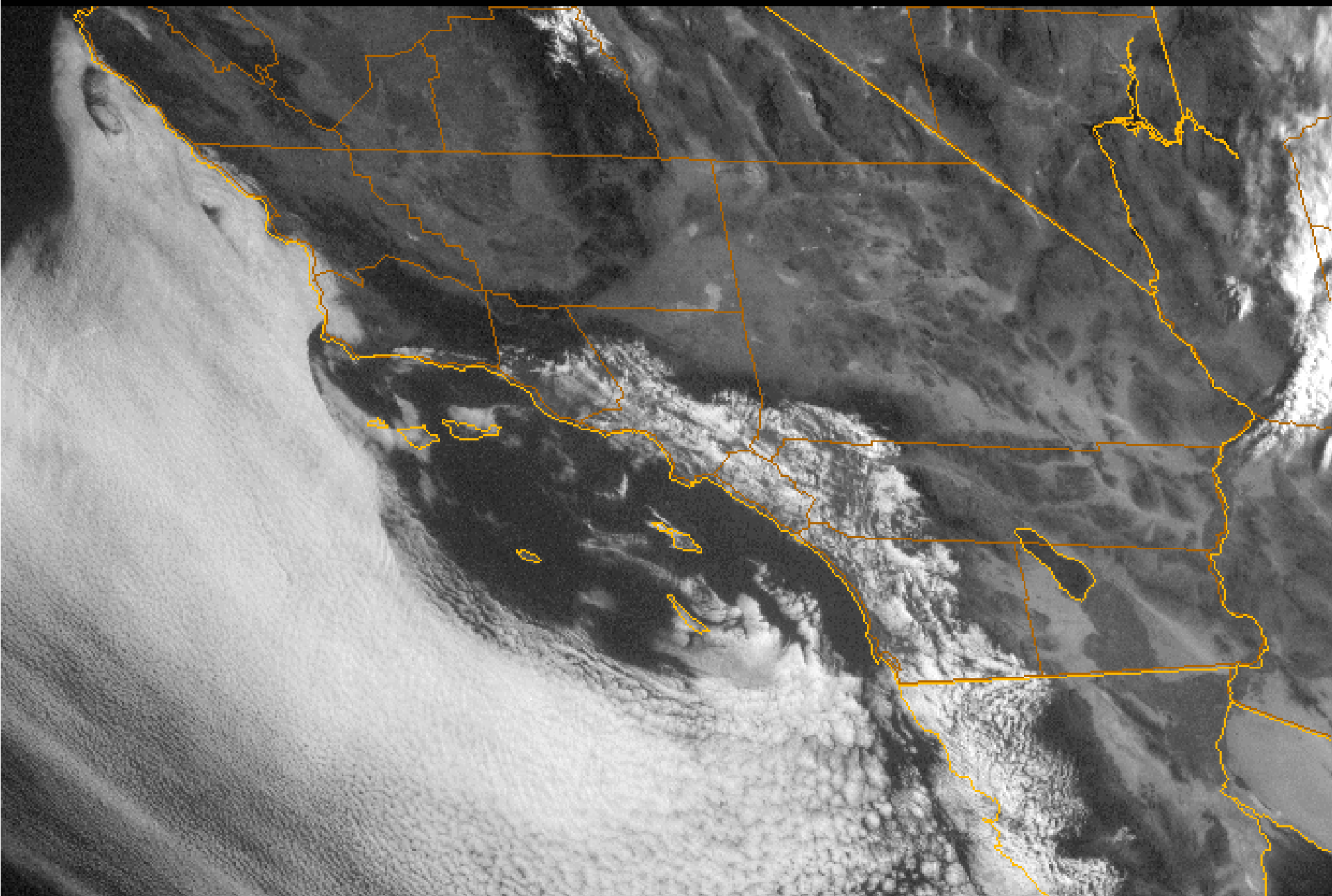
G-10 IMG 01 21 JUN 04 TIME=18:00UTC RES=01.00KM NWS/WR-SSD



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1530 GMT 29 Jun 2004

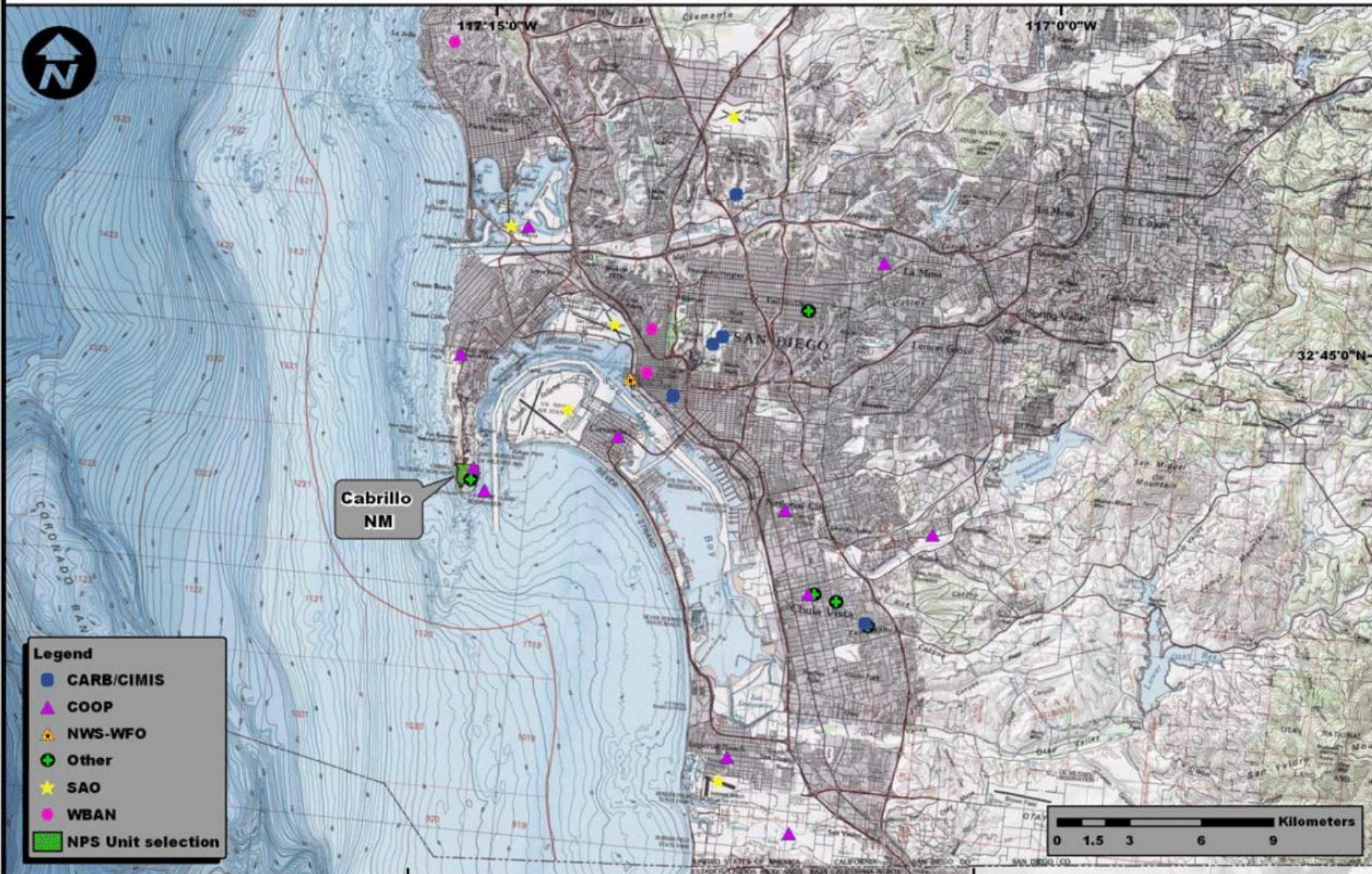
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0002 G-10 IMG 01 29 APR 04120 153000 04322 17157 01.00



Weather - Climate Observing Sites (Cabrillo NM)



000
ASUS66 KSGX 261218
RTPSGX

:SOUTHWESTERN CALIFORNIA TEMPERATURE AND PRECIPITATION SUMMARY
:NATIONAL WEATHER SERVICE SAN DIEGO CA
:530 AM PDT TUE APR 26 2011
:
:***** UPDATED *****
:
:YESTERDAYS HIGH AND 12 HOUR LOW TEMPERATURES AS OF 5 AM TODAY.
: * DENOTES 24 HOUR HIGH TEMPERATURES AS OF 5 PM YESTERDAY.
: OCCASIONALLY THE HIGH TEMPERATURE MAY HAVE OCCURRED AFTER
: 5 PM THE PREVIOUS DAY.
:
:PRECIPITATION FOR THE PAST 24 HOURS. M DENOTES MISSING.
: T DENOTES TRACE OF PRECIPITATION
:
:BR SGX 0426 P DH01/TAIRZX/DH04/TAIRZP/PPDRZZ/SDIRZZ
:
: ID : STATION ELEV : HIGH / LOW / PCPN / SNODEP
: FEET INCHES
:
: ...COASTAL AREAS...
:
YBLC1: * YORBA LINDA 350 : 73 / M / M /
FUL : FULLERTON AIRPORT 96 : 74 / 58 / 0.00 /
ANAC1: * ANAHEIM 335 : 73 / M / M /
STAC1: * SANTA ANA 135 : 73 / M / M /
SDHTB: HUNTINGTON BEACH 5 : 68 / 54 / 0.00 /
SNA : JOHN WAYNE AIRPORT 55 : 70 / 59 / 0.00 /
3L3 : * NEWPORT BEACH 10 : 63 / M / M /
LAGC1: LAGUNA BEACH 35 : 67 / 57 / 0.00 /
SDDPT: DANA POINT 50 : 67 / 59 / 0.00 /
SDFRH: LAKE FOREST 970 : 73 / 53 / 0.00 /
L34 : * OCEANSIDE HARBOR 10 : 62 / 60 / 0.00 /
OKB : OCEANSIDE AIRPORT 28 : M / M / 0.00 /
VSTC1: * VISTA 330 : 73 / M / M /
CRQ : CARLSBAD AIRPORT 328 : 67 / 60 / 0.00 /
SDETS: ENCINITAS 270 : 68 / 58 / M /
SOL : SOLANA BEACH 75 : M / M / M /
DMRC1: * DEL MAR 100 : 67 / M / M /
NKX : MIRAMAR 477 : 70 / 54 / 0.01 /
MYF : MONTGOMERY FIELD 420 : 69 / 58 / 0.00 /
SWDC1: SEA WORLD SAN DIEGO 10 : 67 / 61 / 0.00 /
SAN : SAN DIEGO 15 : 69 / 63 / 0.98 /
CDOC1: * CORONADO 25 : M / M / M /
L13 : CABRILLO NATL MNMT 364 : 66 / 57 / M /
SDNAC: NATIONAL CITY 25 : 69 / 61 / 0.00 /
CVAC1: * CHULA VISTA 56 : 72 / M / M /
IPLC1: * IMPERIAL BEACH 22 : M / M / M /
SDM : BROWN FIELD 525 : 70 / 53 / 0.00 /
:

**Example of a typical
data puzzle**

**04-1252
Cabrillo N.M.**

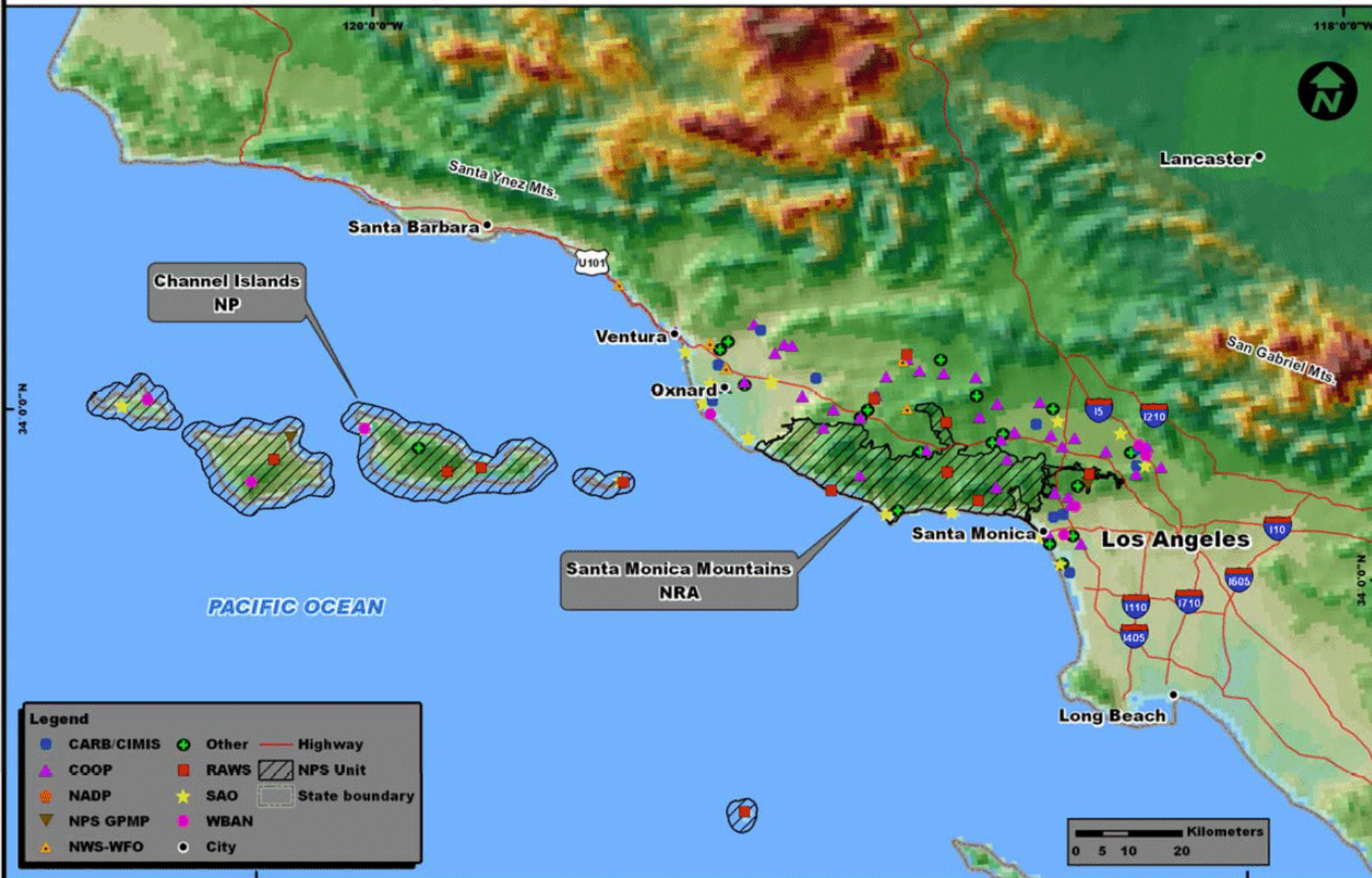
**Not in
NCDC current data
(and thus not in ACIS)
(though shown in
Multi-Network Metadata
System, MMS)**

**But is in
NWS Daily RTP**

**Saved by WRCC but
not by NCDC**



Weather - Climate Observing Sites (Channel Islands NP & Santa Monica Mountains NRA)

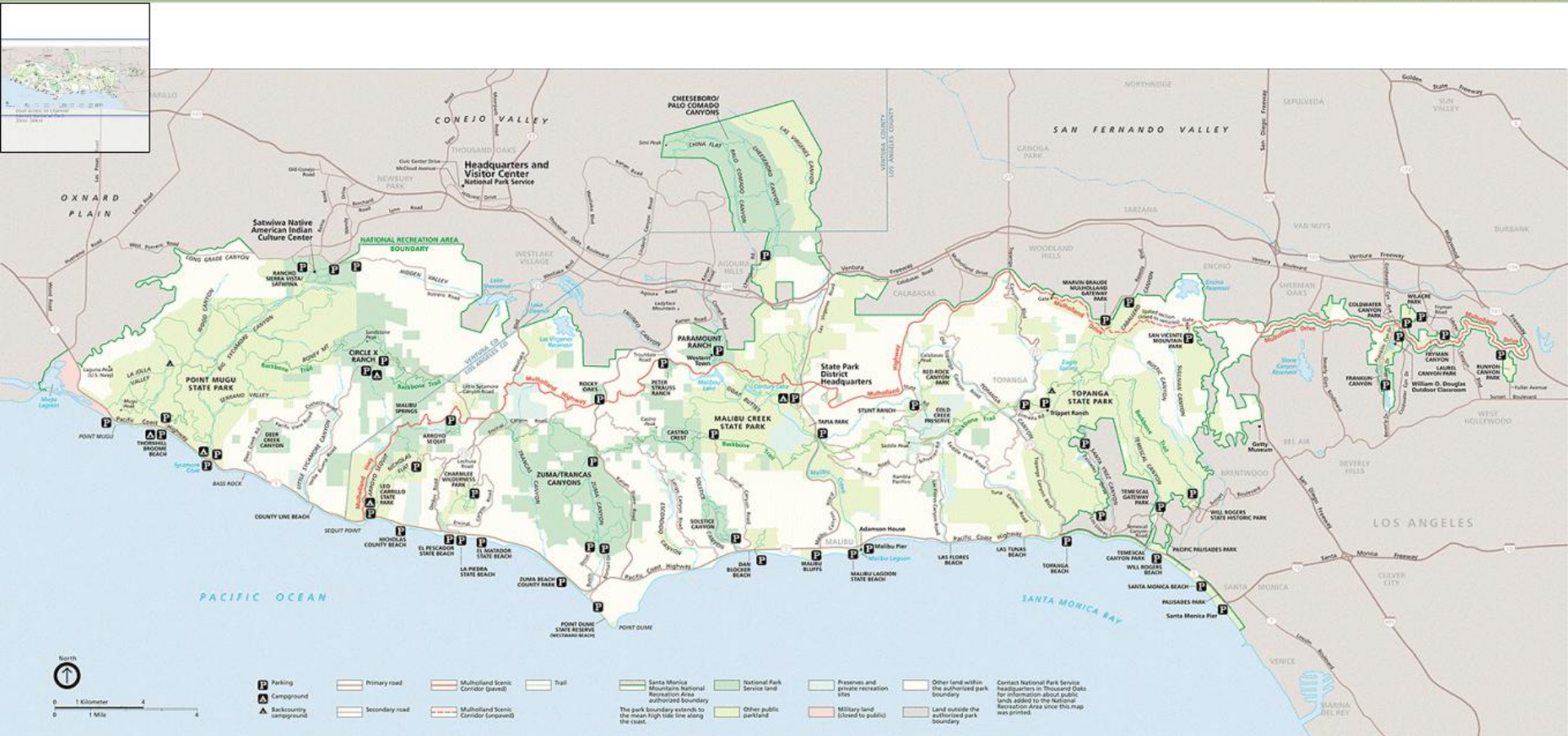


Santa Monica Mountains National Recreation Area

Santa Monica Mountains National Recreation Area Map

close map

print map

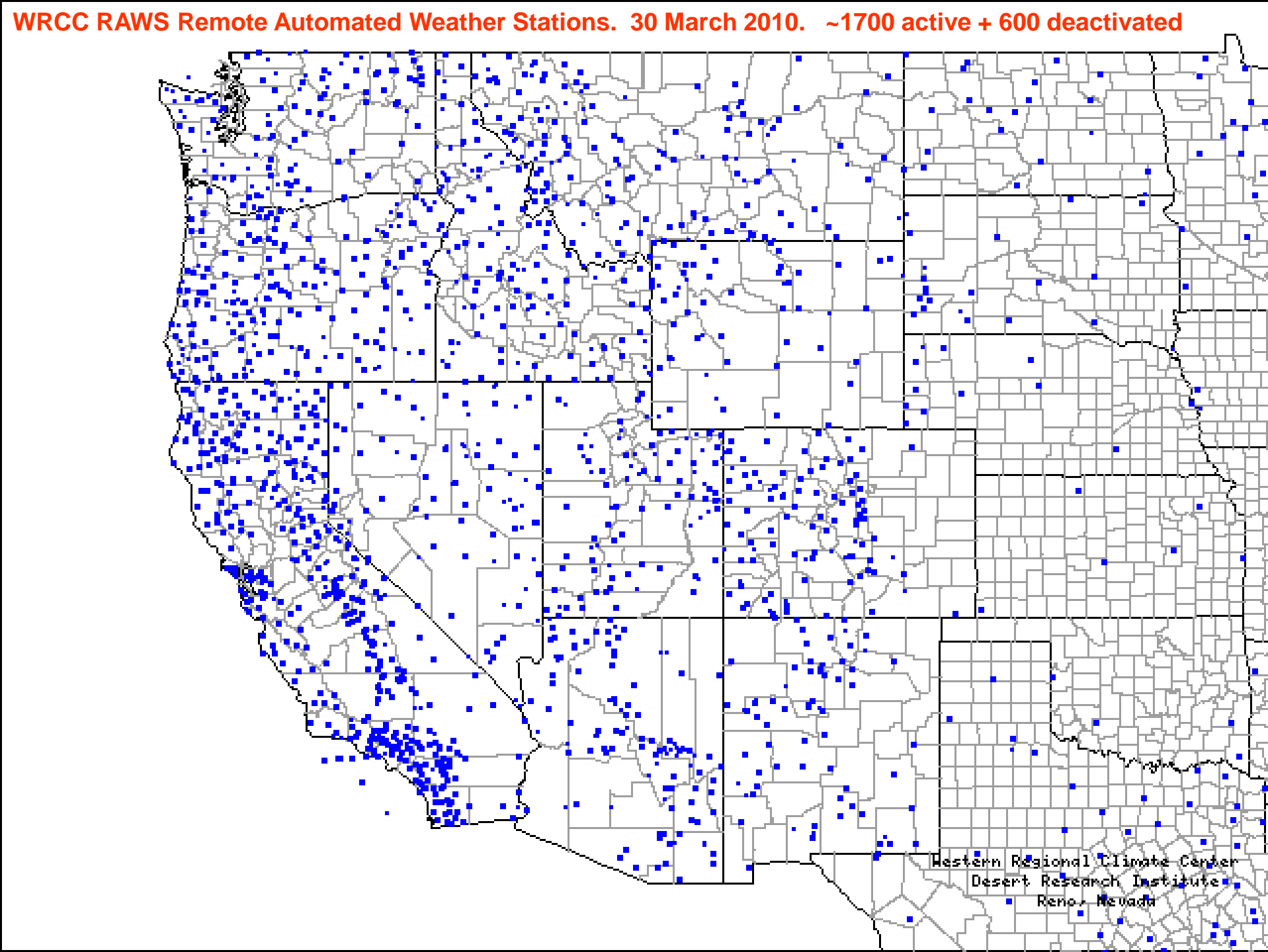


Santa Monica Mountains National Recreation Area - West Side

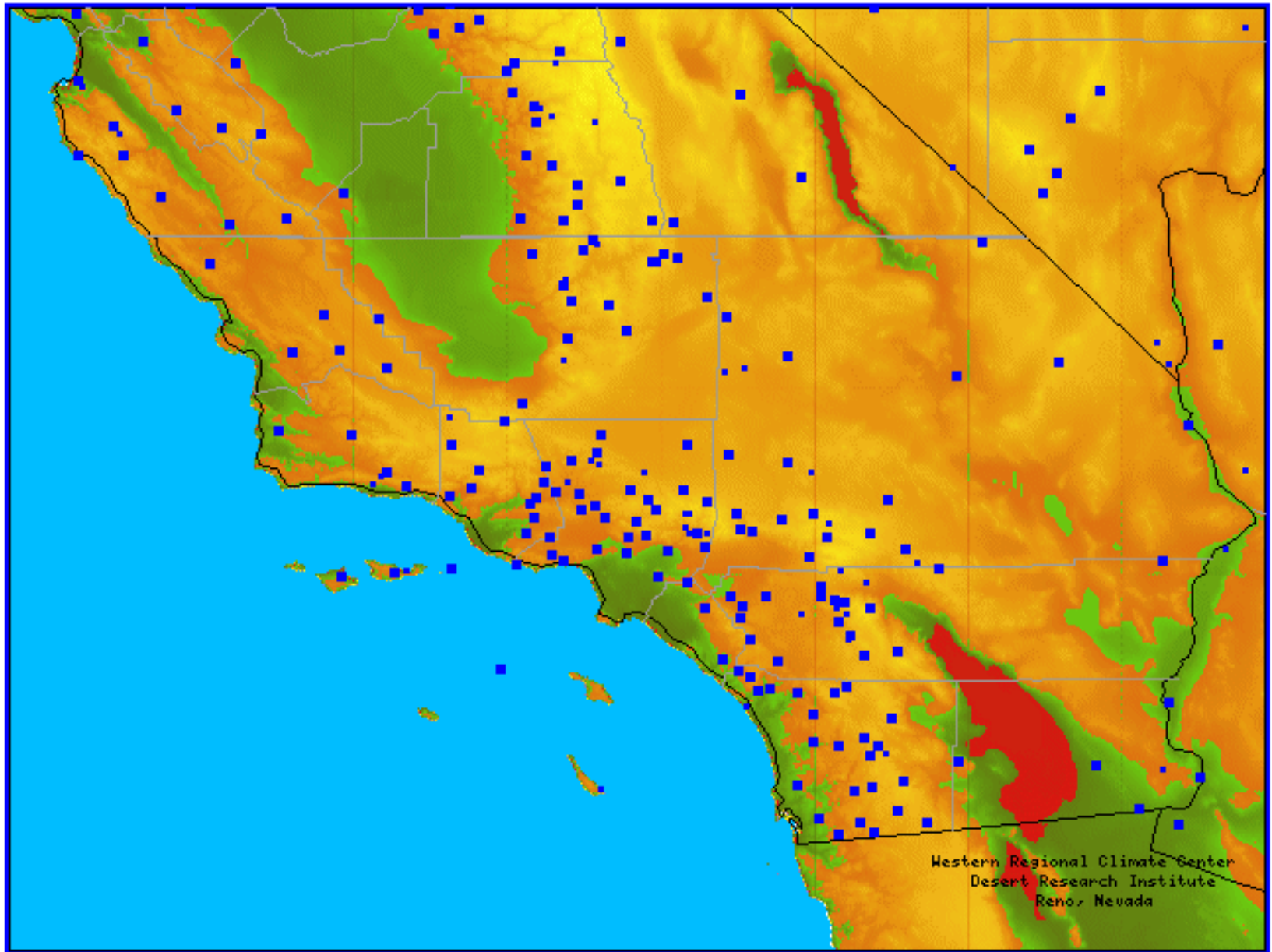


Santa Monica Mountains National Recreation Area - East Side





RAWS Stations in Southern California



www.raws.dri.edu

Channel Island National Park Stations

RAWS/NDBC Buoy/Manual Ranger Stations

Recent web page changes:

- Composite Daily Summaries added. (Link found below the map.)



Click on site of interest for more information.
Data is subject to review and verification.

[Composite Daily Summaries](#)

Historical Climate Data

[Anacapa Island](#)
[Santa Barbara Island](#)
[Santa Cruz Island](#)
[San Miguel Island](#)
[Santa Rosa Island](#)

Cooperating Agencies:



[Desert Research Institute](#)



[National Interagency
Fire Center](#)



[Western Regional
Climate Center](#)



[National
Park Service](#)



[National
Data Buoy Center](#)

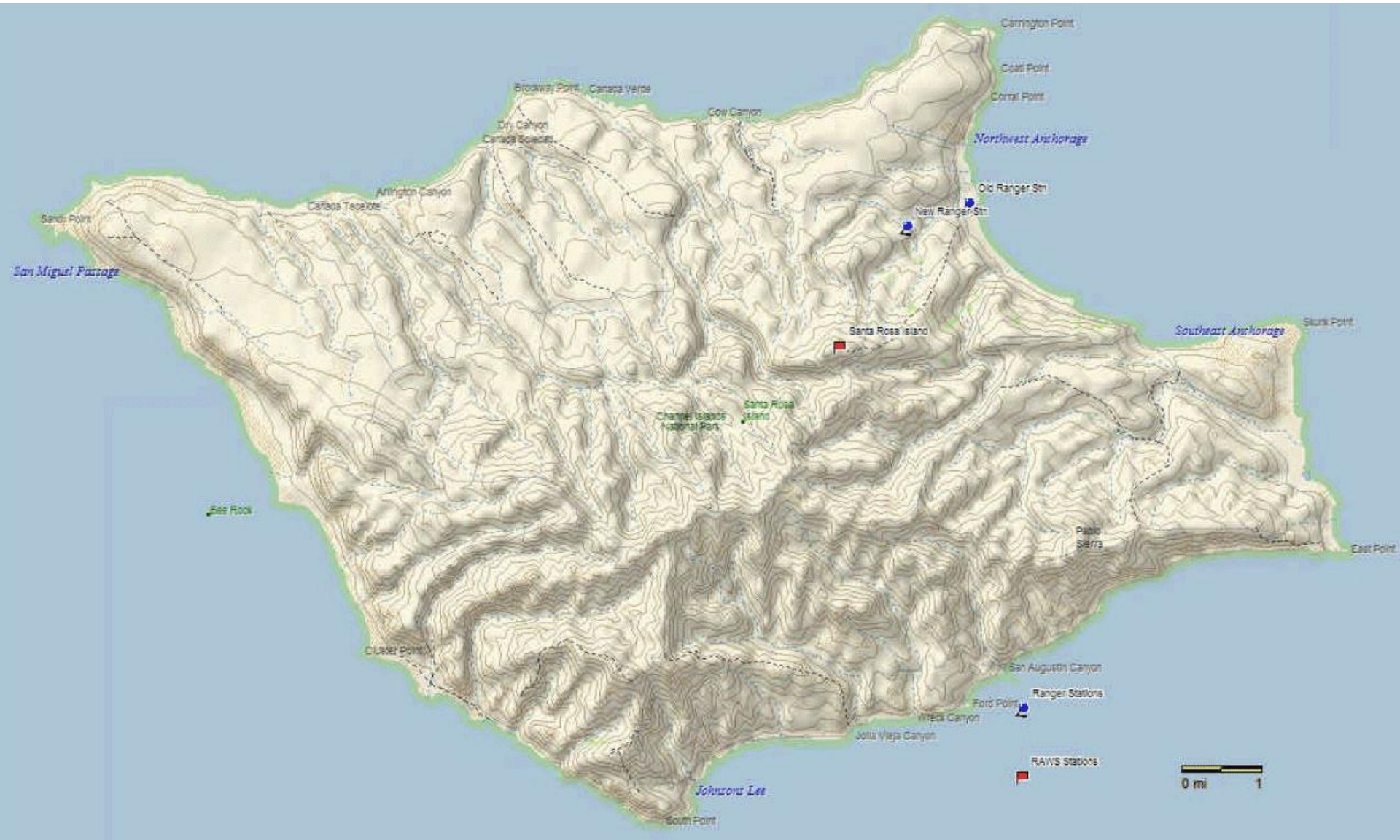


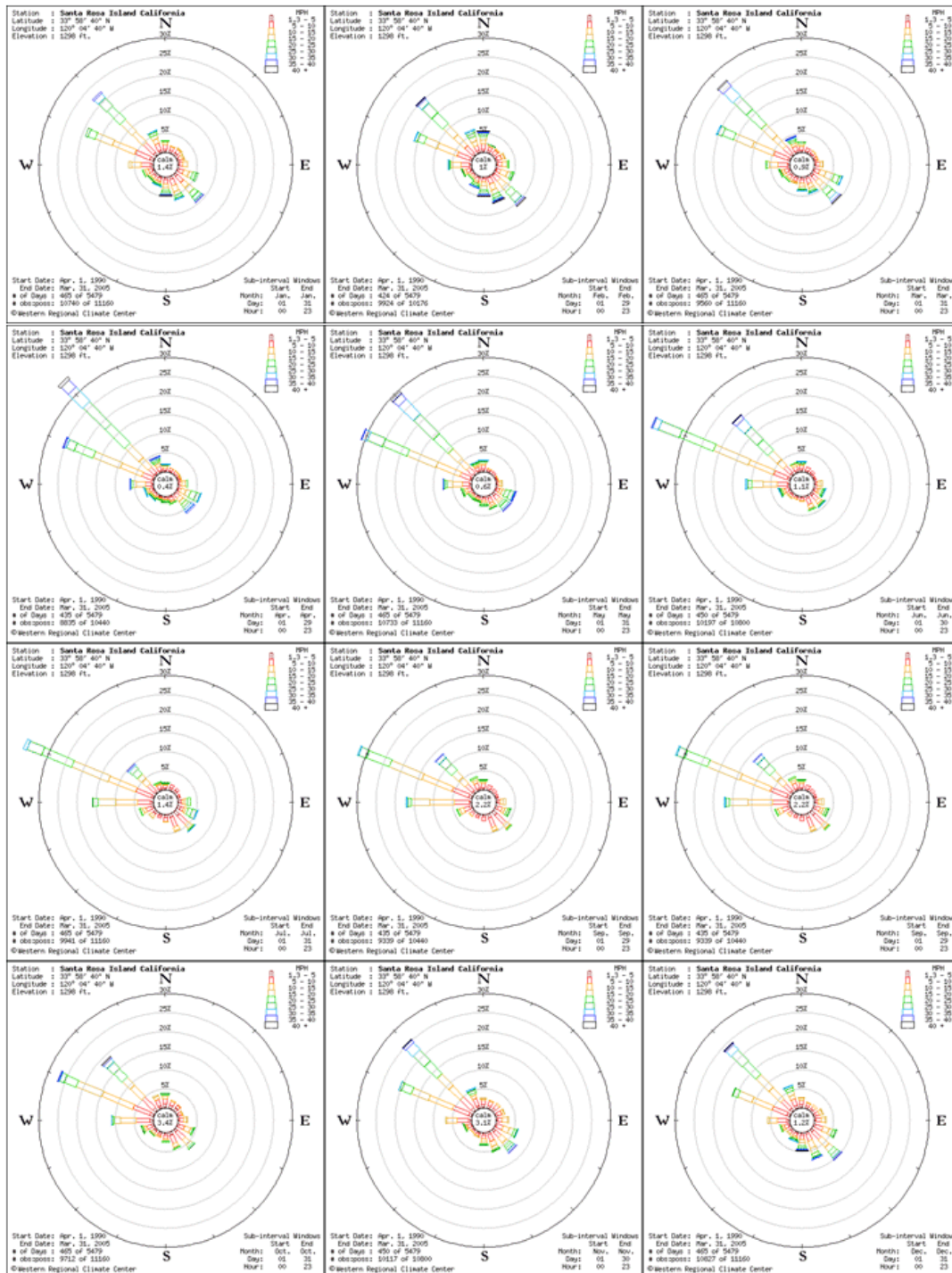
[U.S. Geologic Survey](#)

Channel Islands - San Miguel Island



Channel Islands - Santa Rosa Island





Monthly Wind Roses

Santa Rosa Island

Black Mtn summit
1300 ft

Jan Feb Mar
Apr May Jun
Jul Aug Sep
Oct Nov Dec

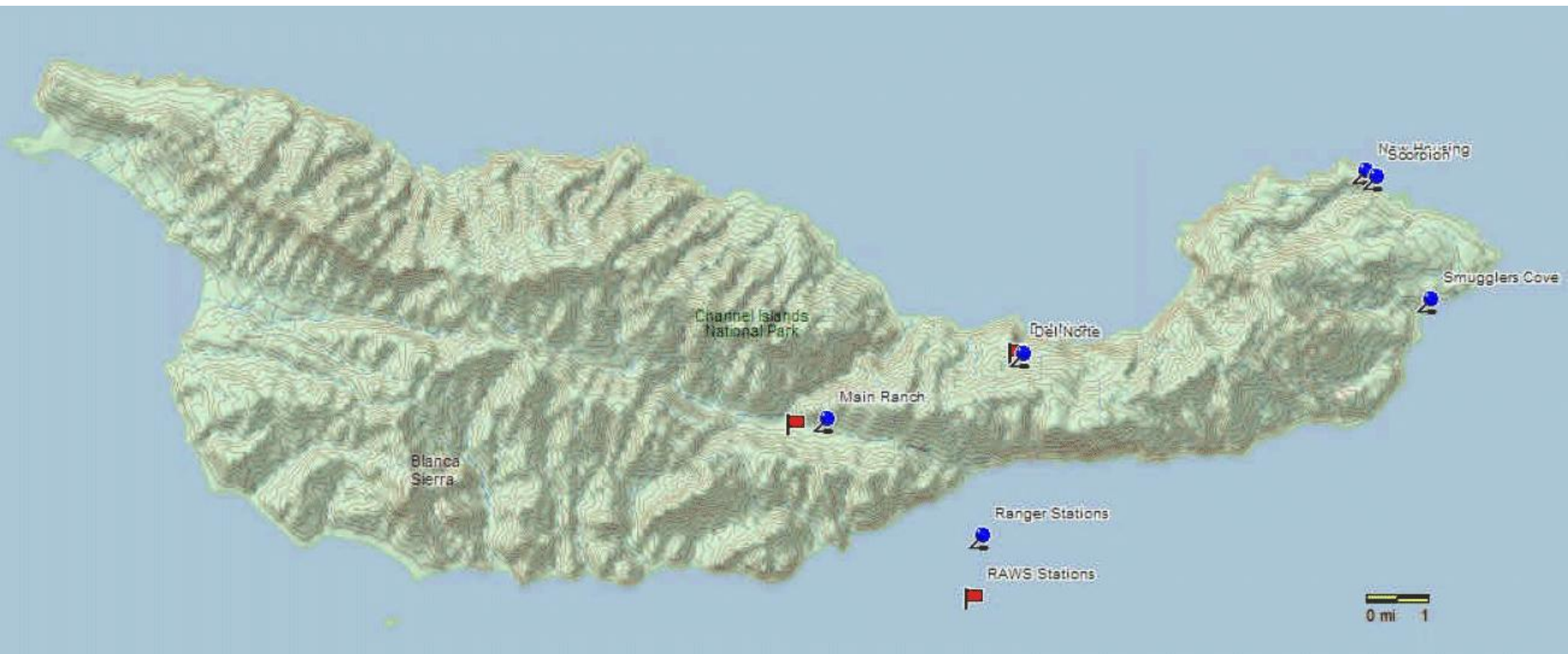
All hours

1990-2005

Approx 10,000 observations
each month.

Redmond & McCurdy, 2005.

Channel Islands - Santa Cruz Island



Channel Islands - Santa Cruz Island East Side Detail



Santa Cruz RAWS Looking North



Channel Islands - Anacapa Island



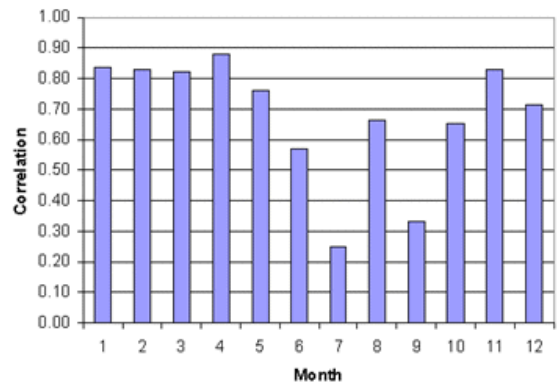
Channel Islands - Santa Barbara Island



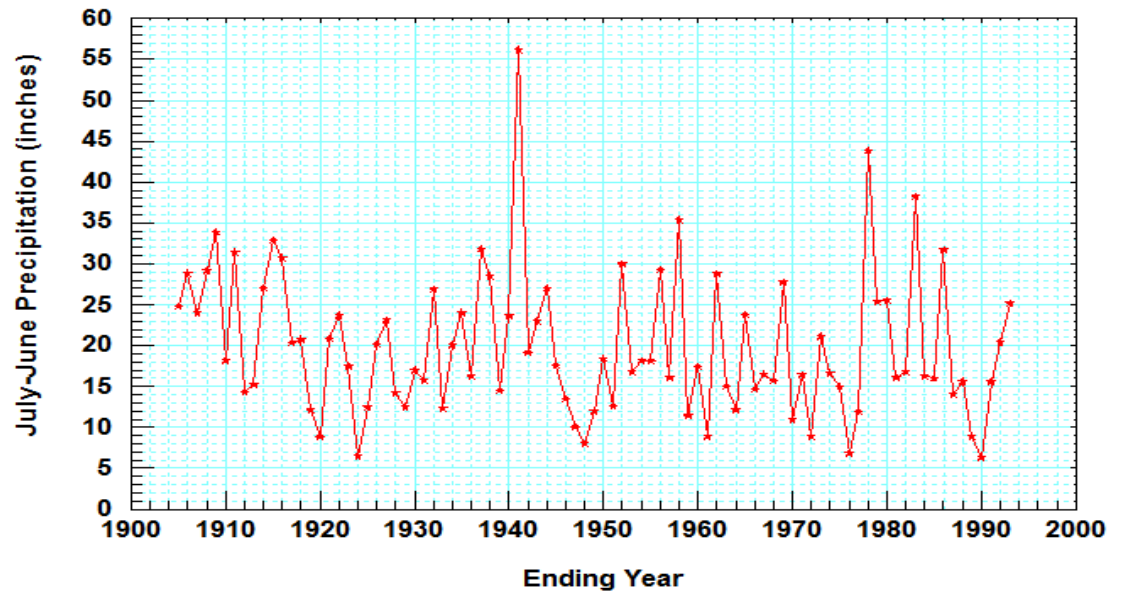
Santa Barbara Island Climate Station



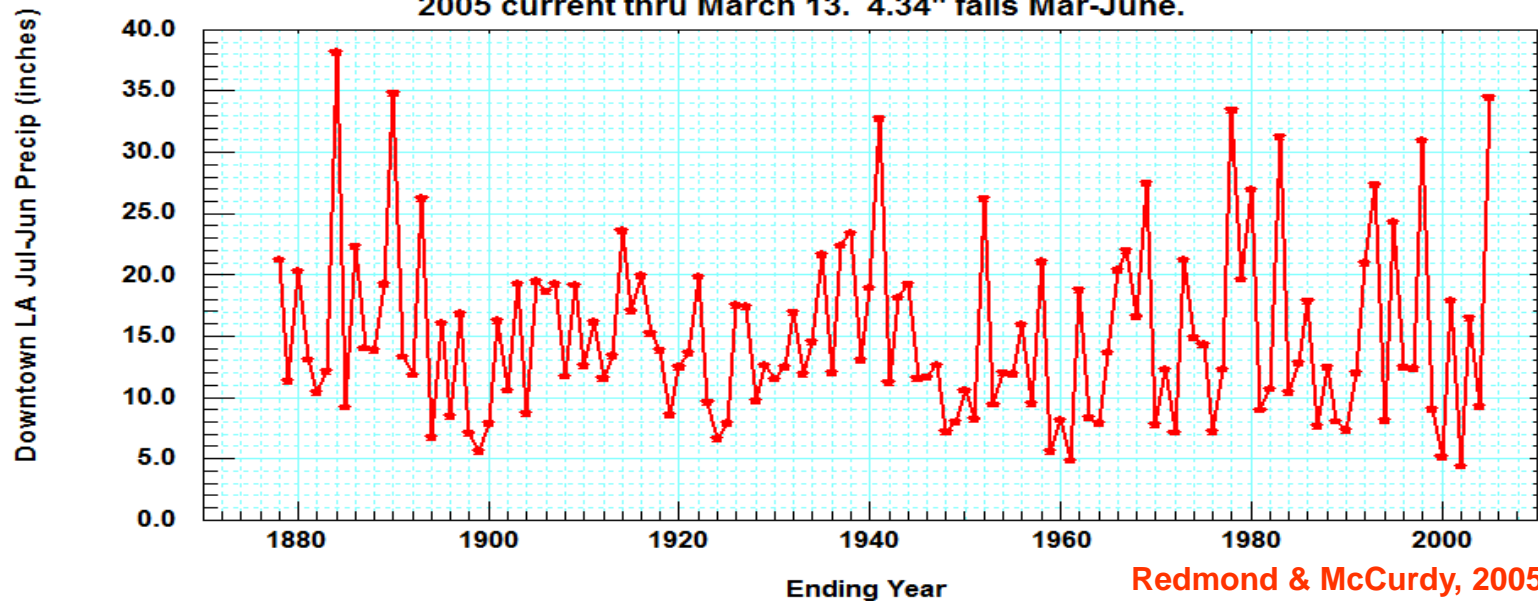
Monthly Precipitation Correlations
Santa Cruz Main Ranch vs Los Angeles Downtown



Santa Cruz Island Main Ranch
Annual Winter-centered Precipitation
July through June, 1904-05 / 1992-93.



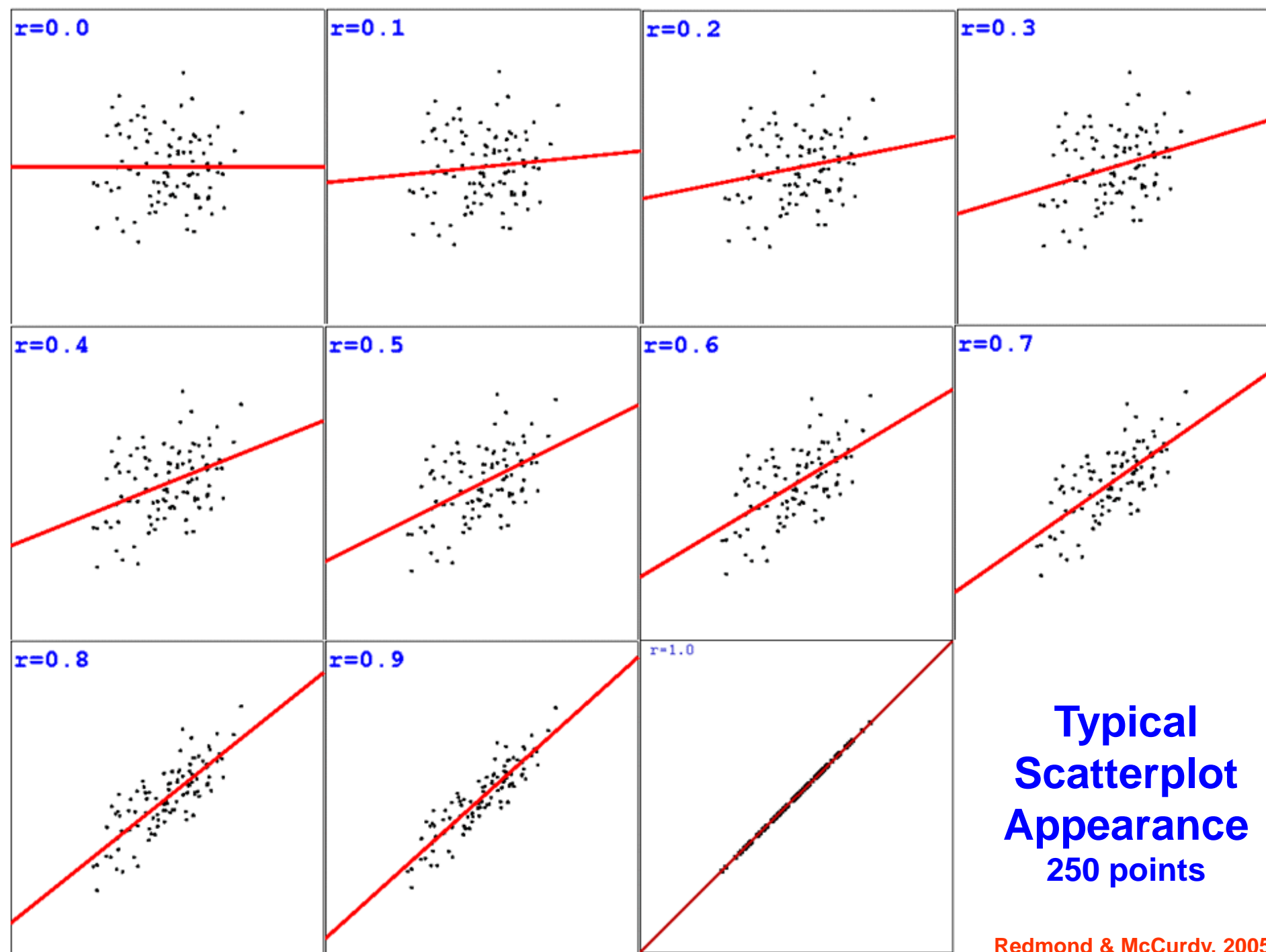
Downtown Los Angeles Precipitation.
July thru June, 1877-78 thru 2004-05.
Mean 15.05 inches, c.v. 47 percent.
2005 current thru March 13. 4.34" falls Mar-June.



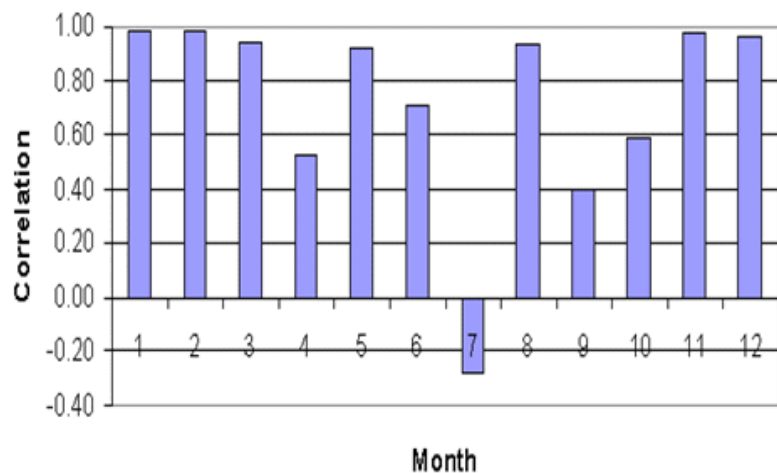
Winter-centered Precipitation
Main Ranch
1904-05 / 1992-93
and
Downtown Los Angeles
1877-78 / 2004-05 (Mar 13)

$r = 0.82$
(89 years)

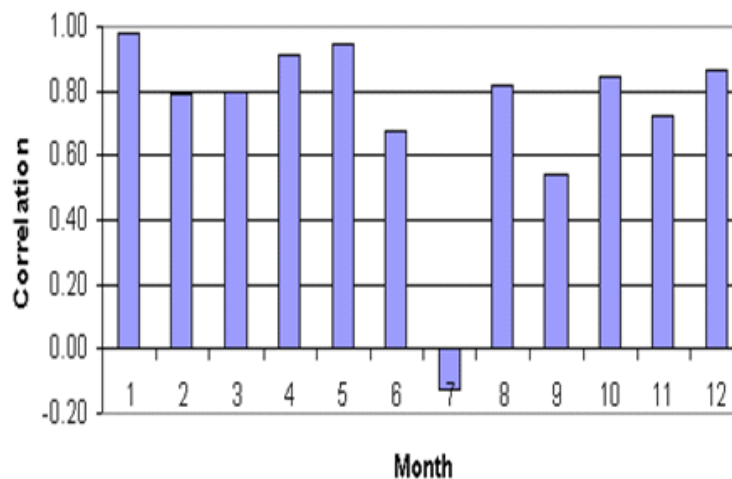
Redmond & McCurdy, 2005.



Monthly Precipitation Correlations
Santa Cruz RAWS vs Santa Barbara Coop



Monthly Precipitation Correlations
Santa Rosa RAWS vs Santa Barbara Coop



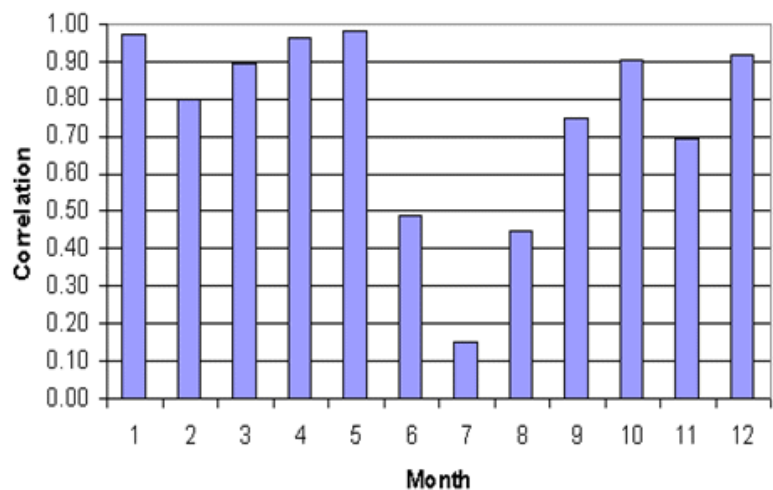
Correlation
by month

Precip

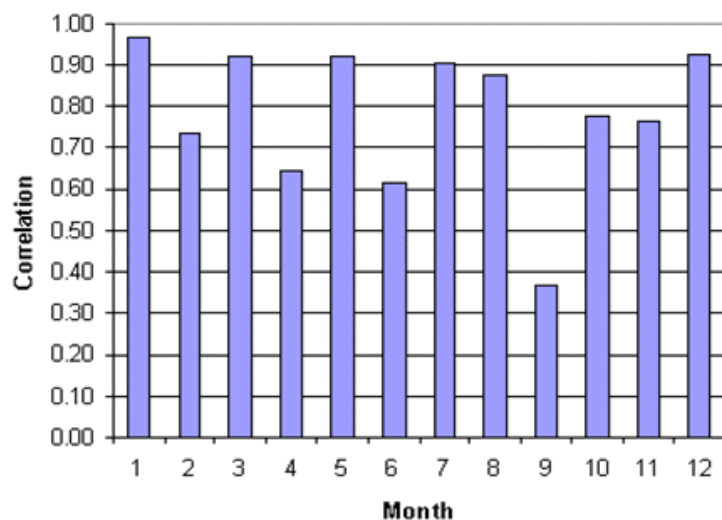
RAWS
vs
RAWS and
COOP

Yrs
9-12, 11-13

Monthly Precipitation Correlations Santa Rosa
RAWS vs Oxnard Coop



Monthly Precipitation Correlations
Santa Rosa RAWS vs Santa Cruz RAWS

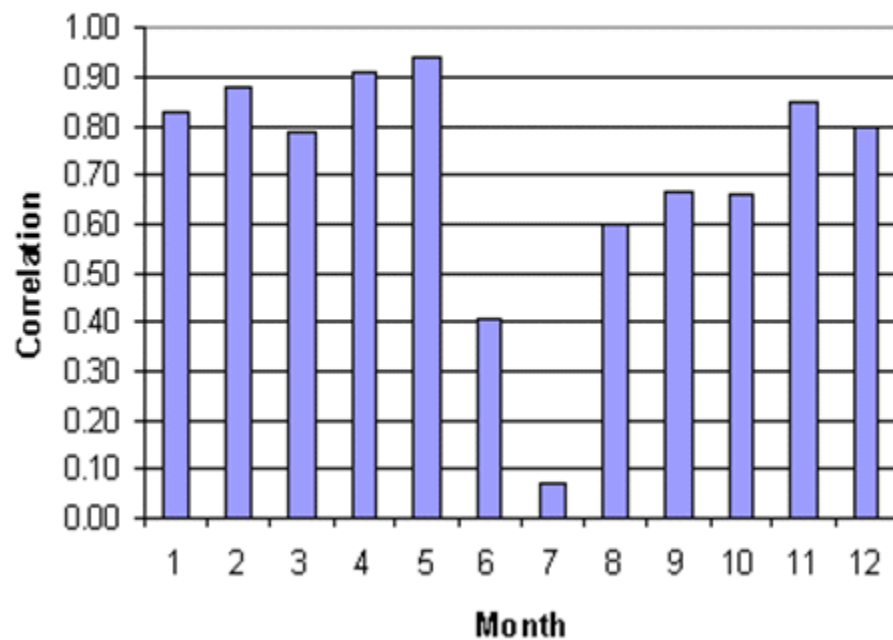


10-12, 10-12

Correlation by month. Precipitation. Santa Cruz Main Ranch vs 2 shore stations.

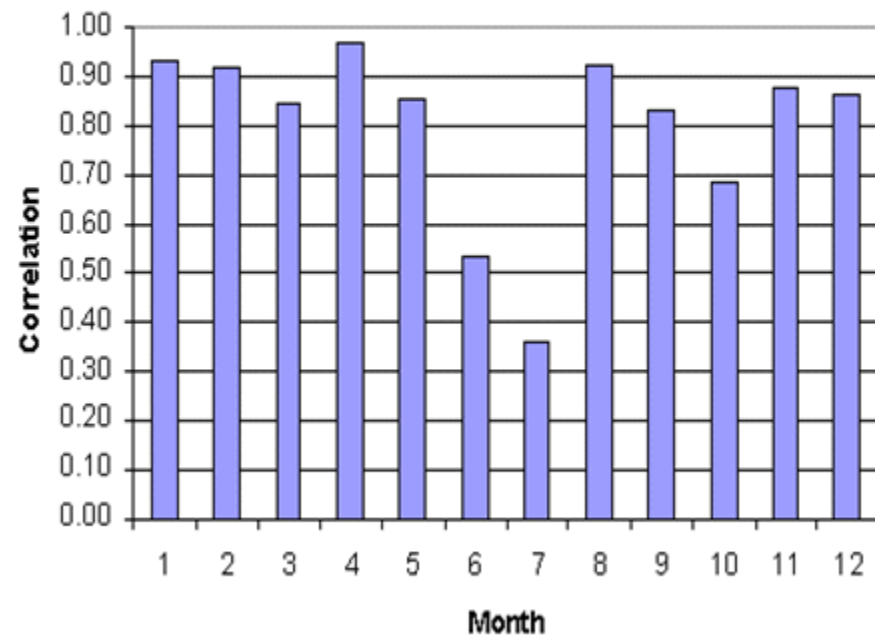
43 Years

Monthly Precipitation Correlations
Santa Cruz Main Ranch vs Lompoc Coop



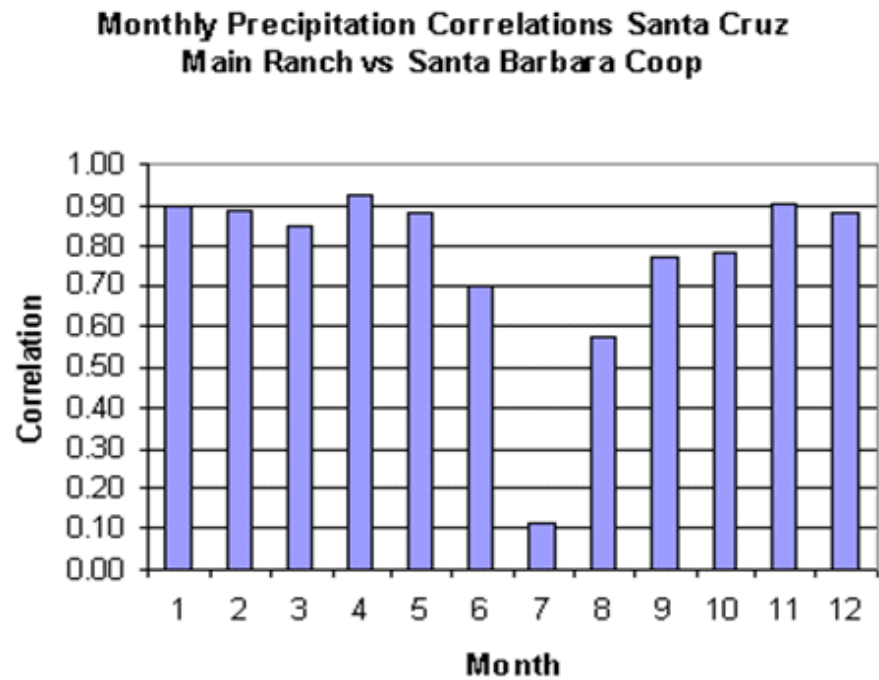
53 Years

Monthly Precipitation Correlations Santa Cruz
Main Ranch vs Santa Barbara Airport

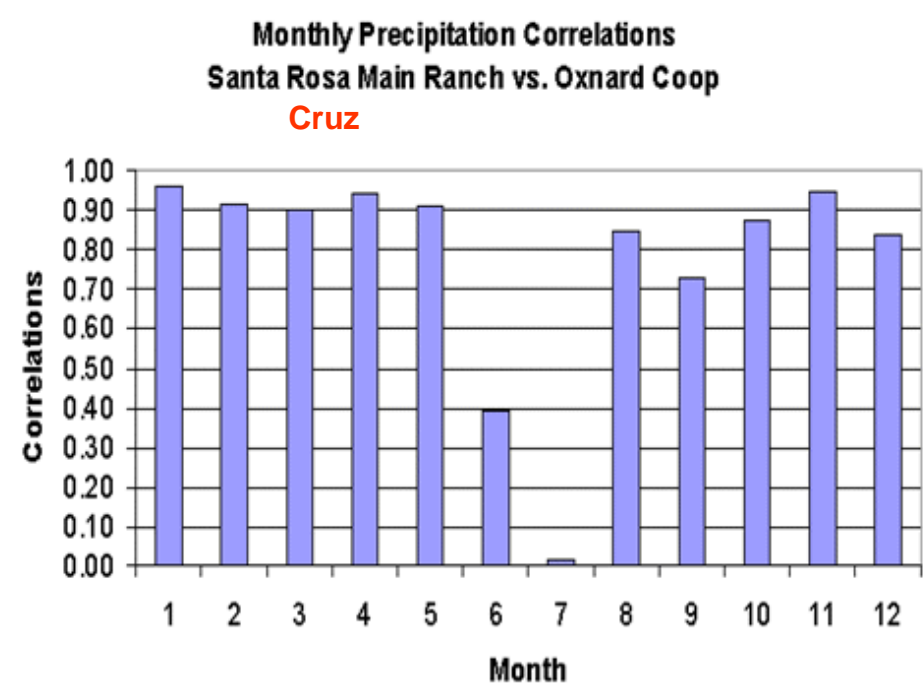


Correlation by month. Precipitation. Santa Cruz Main Ranch vs 2 shore stations.

86-90 Years

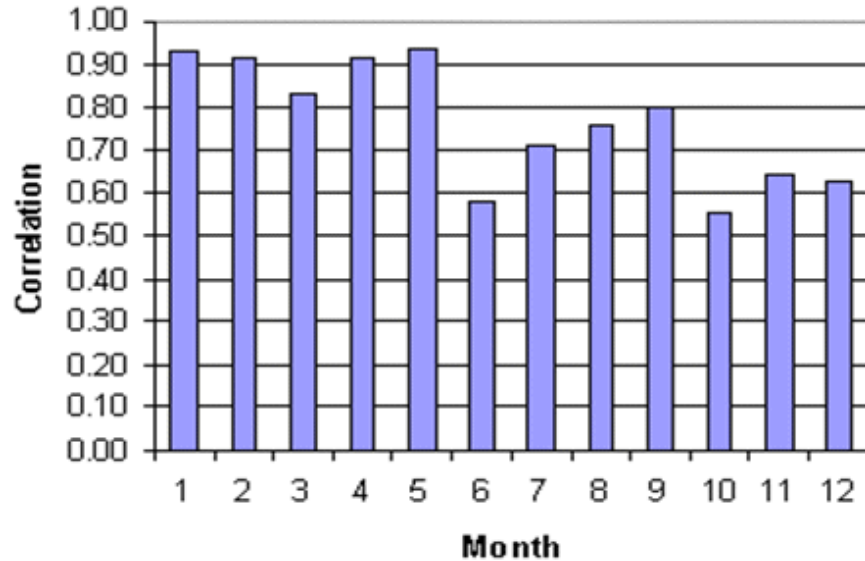


53 Years

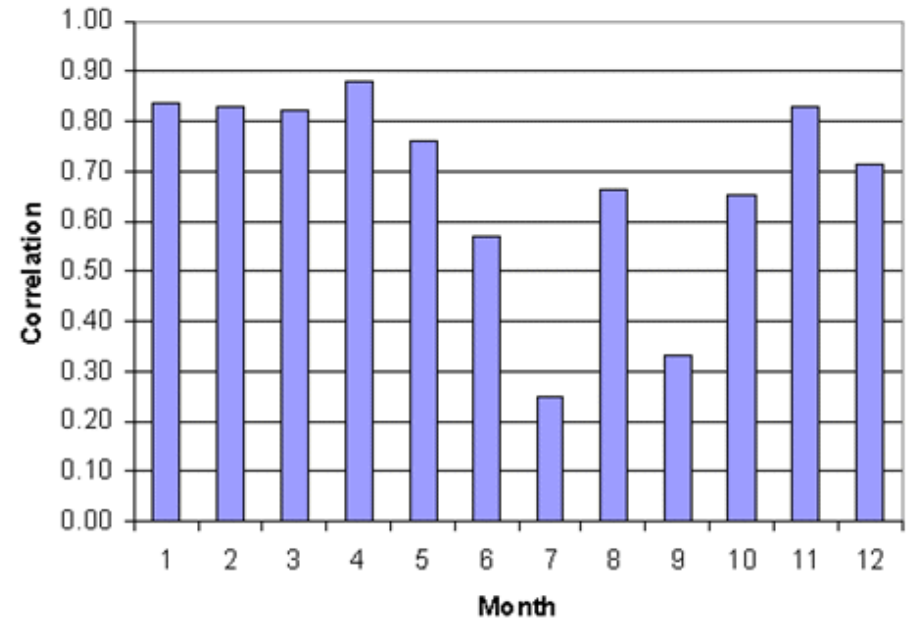


Correlation by month. Precipitation. Santa Cruz Main Ranch vs Los Angeles. Los Angeles Airport 49 Years Los Angeles Downtown 89-90 Years

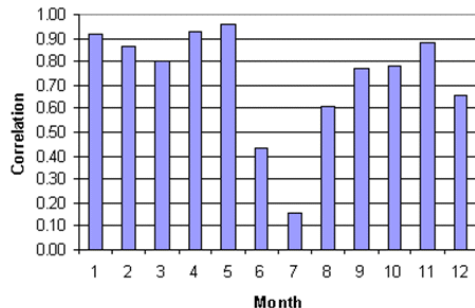
**Monthly Precipitation Correlations
Santa Cruz Main Ranch vs Los Angeles
Airport**



**Monthly Precipitation Correlations
Santa Cruz Main Ranch vs Los Angeles Downtown**



**Monthly Precipitation Correlations
Santa Cruz Main Ranch vs Long Beach Airport**



Santa Cruz Main Ranch vs Long Beach Airport

35 years.

Correlation by month

Temperature

Santa Cruz RAWS
vs

Shore stations
and vs

Santa Rosa RAWS

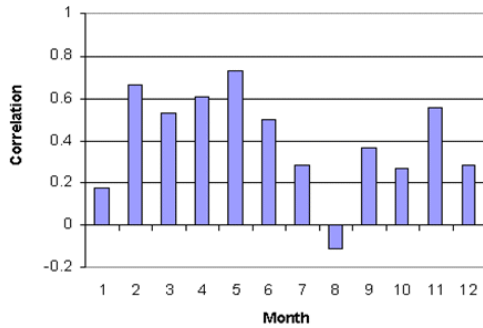
Yrs

10-12, 6-8

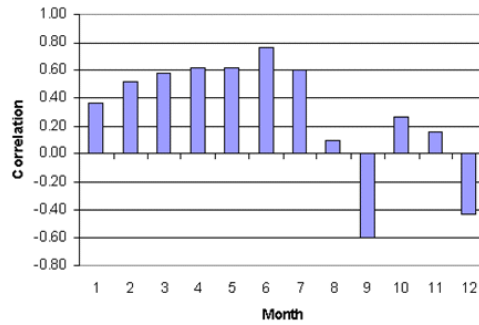
9-12, 10-12

10-12, 9-12

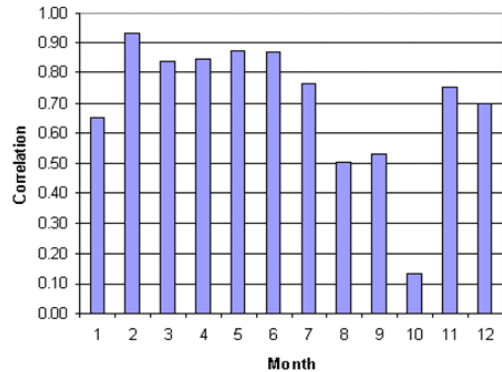
Monthly Temperature Correlations
Santa Cruz RAWS vs Lompoc Coop



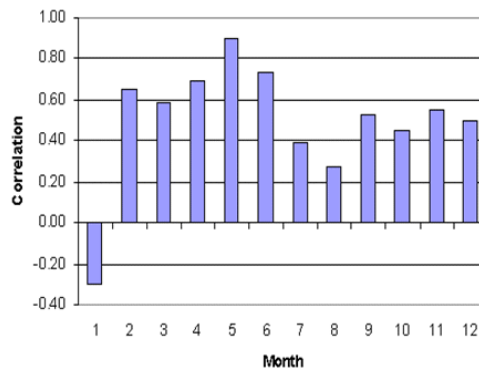
Monthly Temperature Correlations
Santa Cruz RAWS vs Santa Barbara Airport



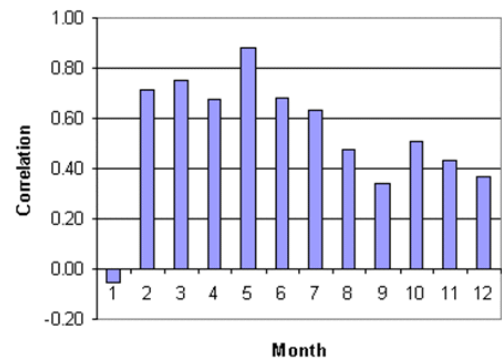
Monthly Temperature Correlations
Santa Cruz RAWS vs Santa Barbara Coop



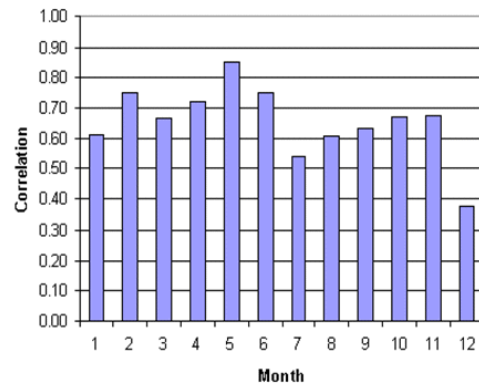
Monthly Temperature Correlations
Santa Cruz RAWS vs Oxnard Coop

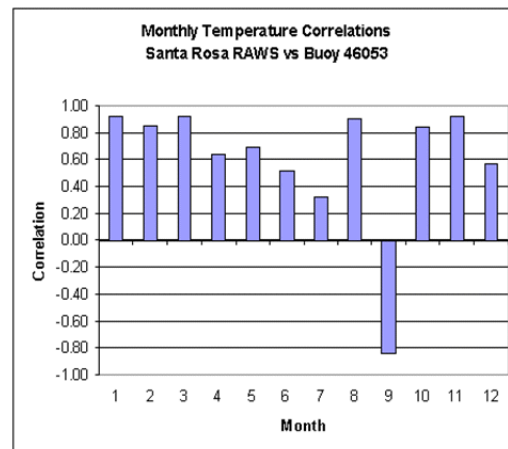
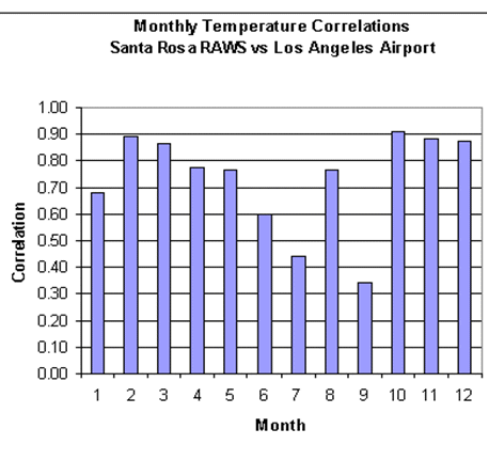
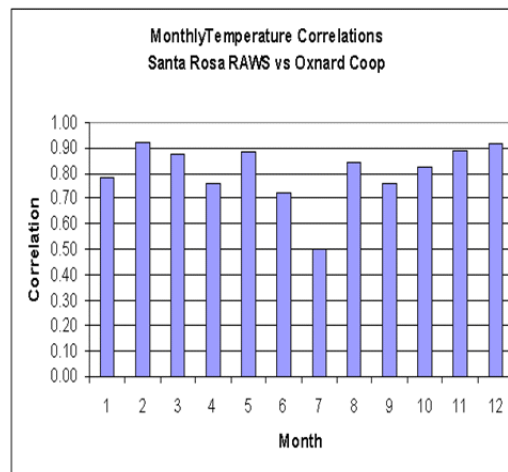
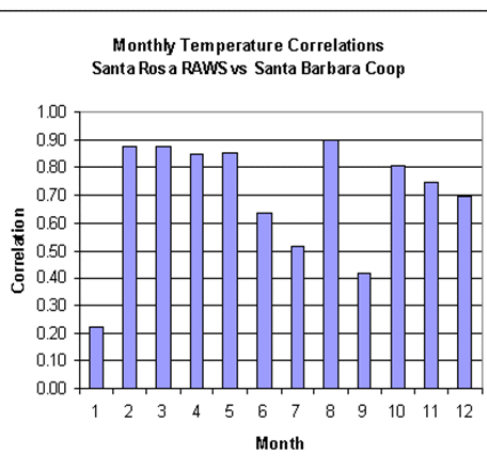
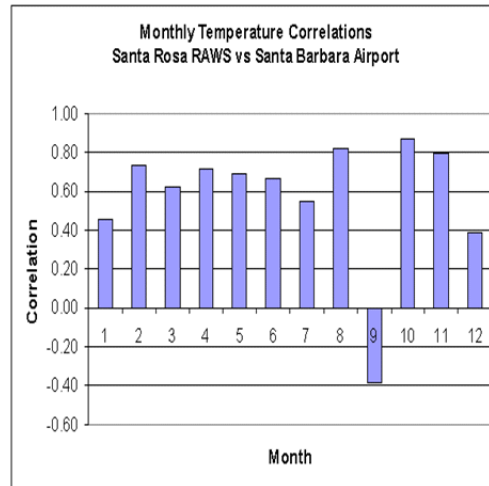
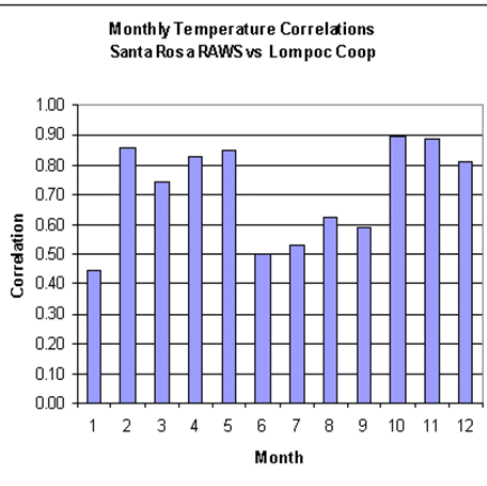


Monthly Temperature Correlations
Santa Cruz RAWS vs Los Angeles Airport



Monthly Temperature Correlations
Santa Cruz RAWS vs Santa Rosa RAWS





Correlation by month

Temperature

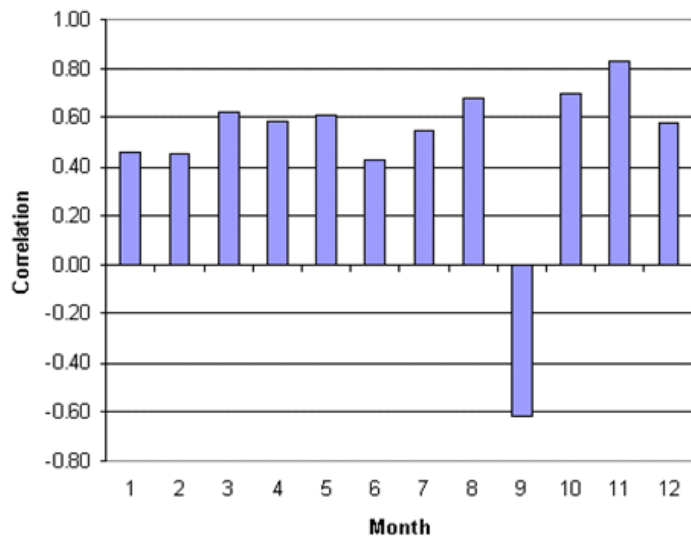
**Santa Rosa RAWS
vs
Shore stations
and vs
Buoy 46053**

**Yrs
10-13, 6-8**

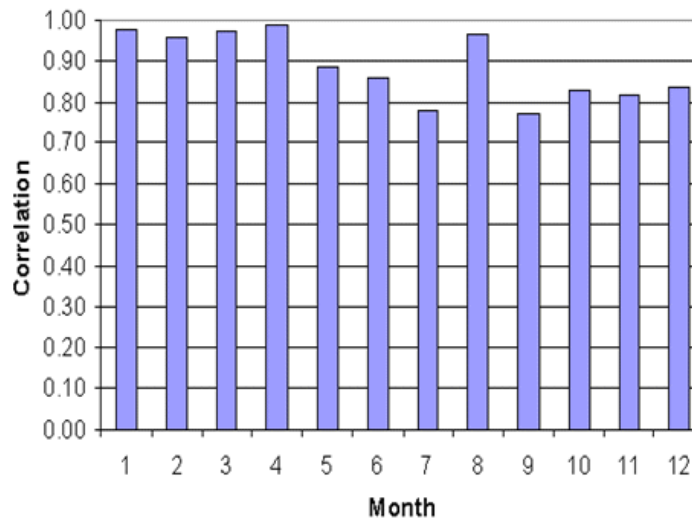
10-13, 9-13

10-13, 6-8

Monthly Temperature Correlation
Santa Cruz RAWS vs Buoy 46053



Monthly Temperature Correlations
Buoy 46025 vs Buoy 46053



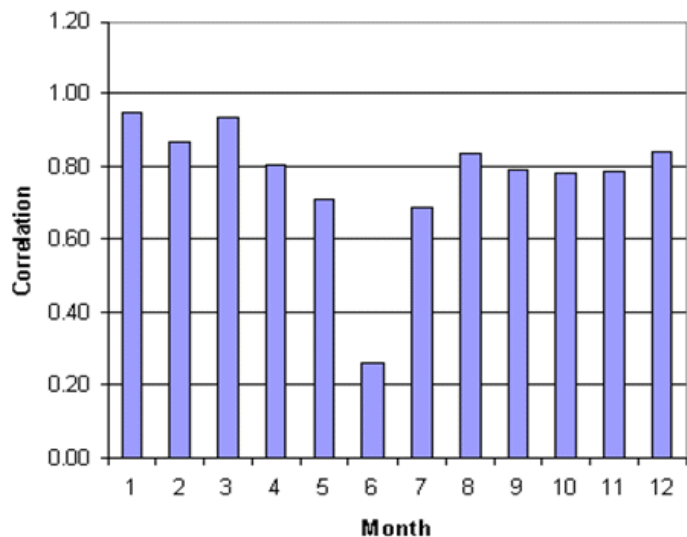
Correlation
by month

Temperature

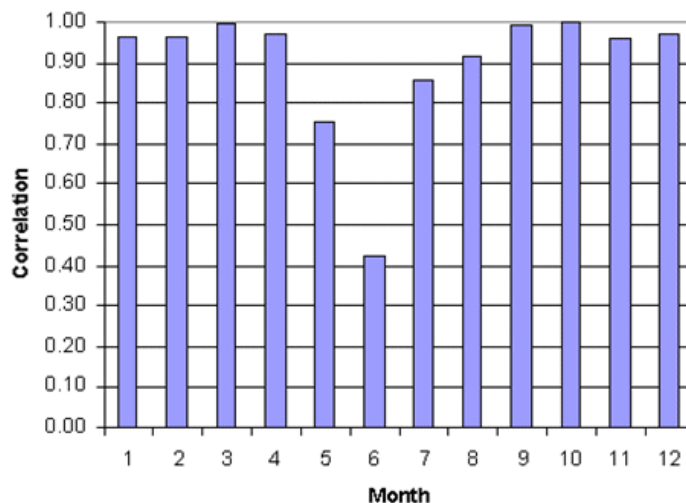
Santa Cruz RAWS
vs
Buoy 53

Buoys
vs
Buoys

Monthly Temperature Correlations
Buoy 46025 vs Buoy 46054

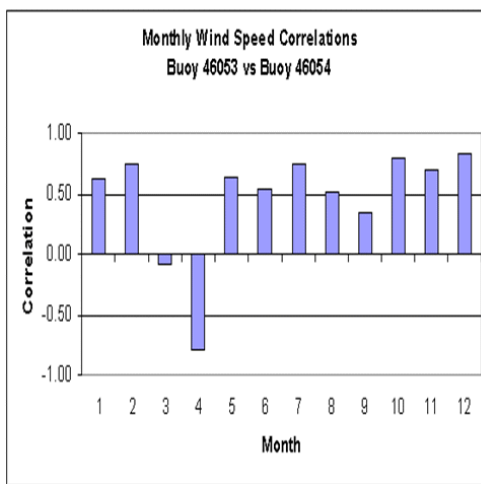
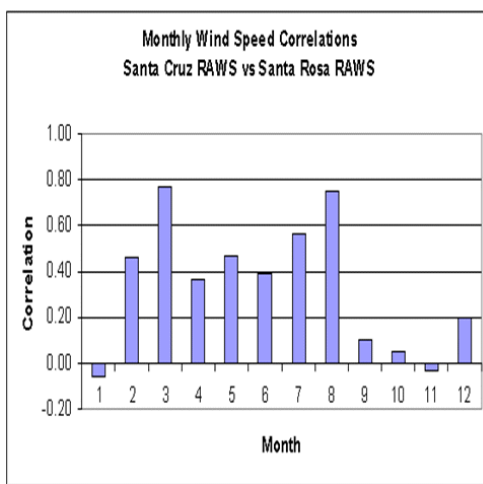
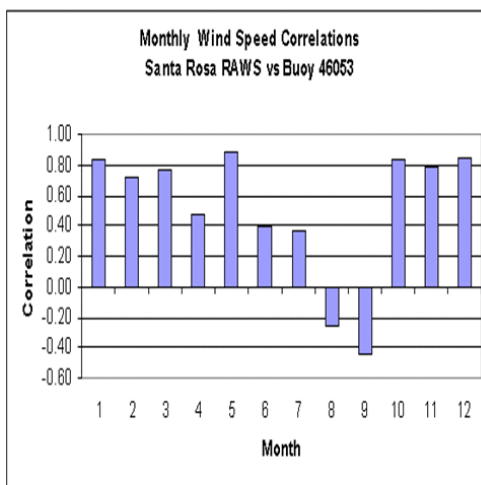
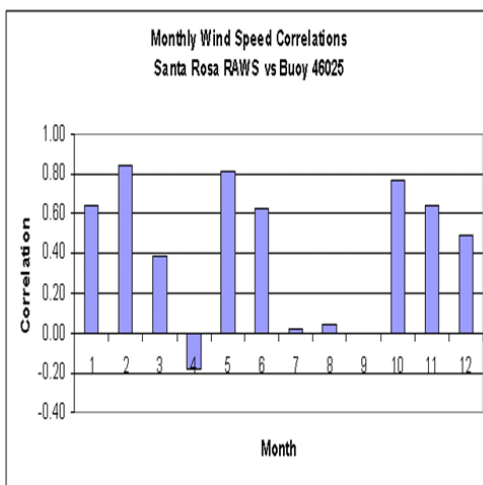
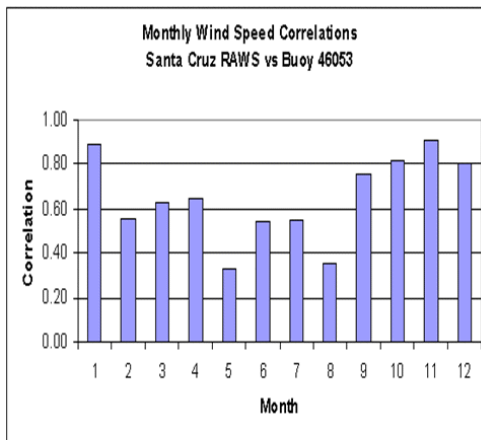
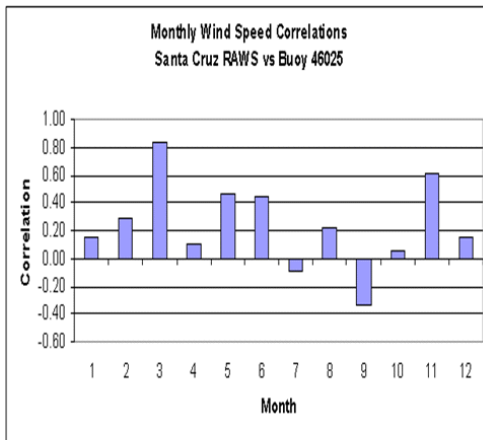


Monthly Temperature Correlations
Buoy 46053 vs Buoy 46054



Yrs
5-7, 7-8

7-10, 5-8



Correlation by month

Scalar Wind Speed

**Santa Cruz, Santa Rosa RAWS
vs
Buoys**

**Santa Cruz RAWS
vs
Santa Rosa RAWS**

**Buoys
vs
Buoys**

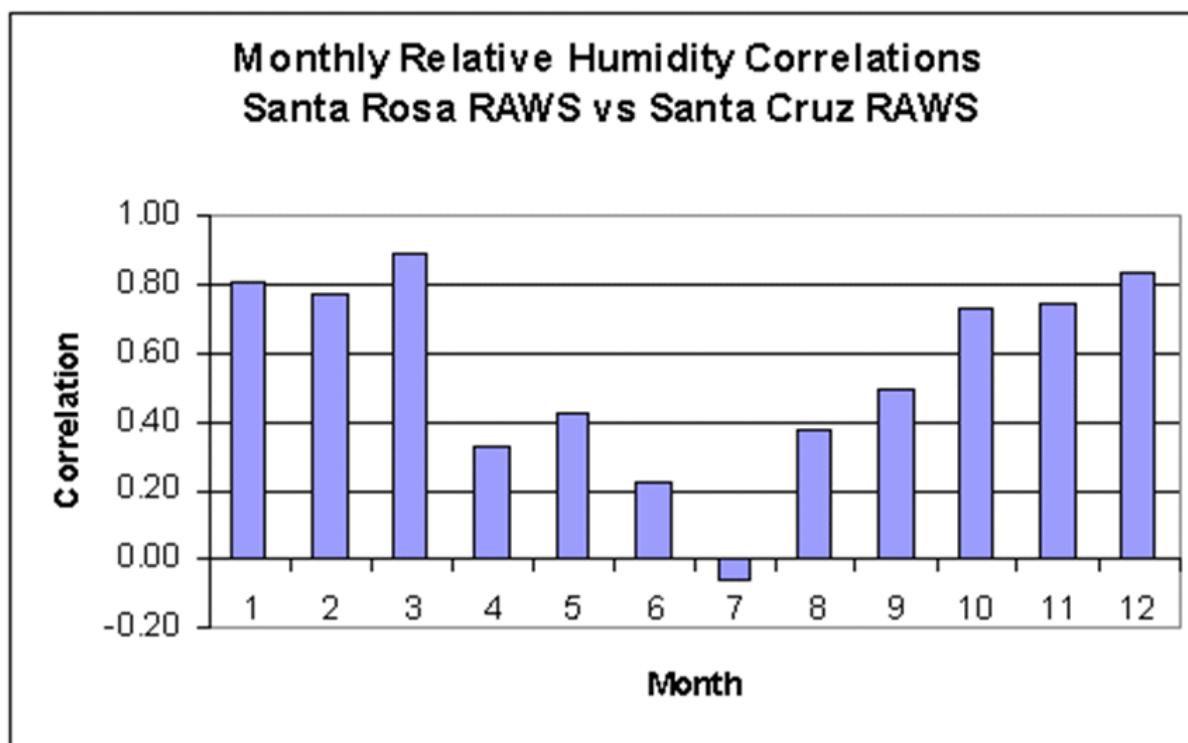
**Yrs
10-12, 5-7**

10-13, 6-8

9-12, 5-8

Correlation by month. Relative Humidity. Santa Rosa RAWS vs Santa Cruz RAWS.

9-12 yrs

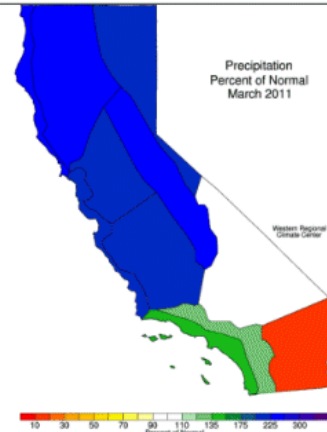
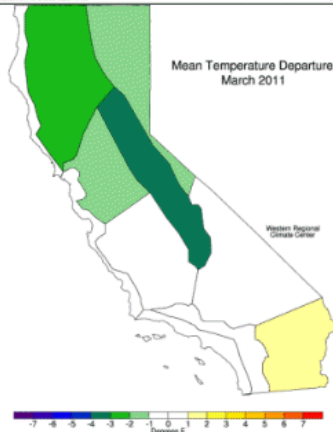
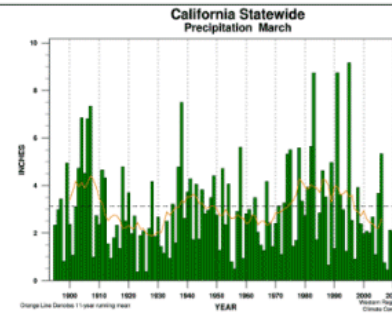
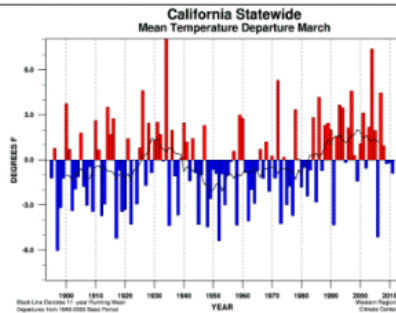
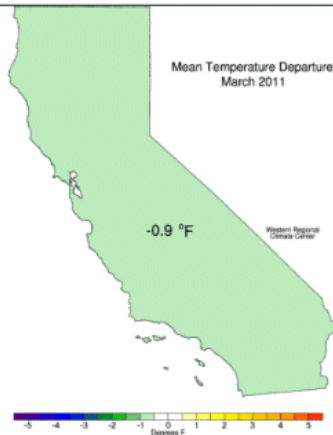


California Climate Tracker

Tracking Climate Variability and Change for the State

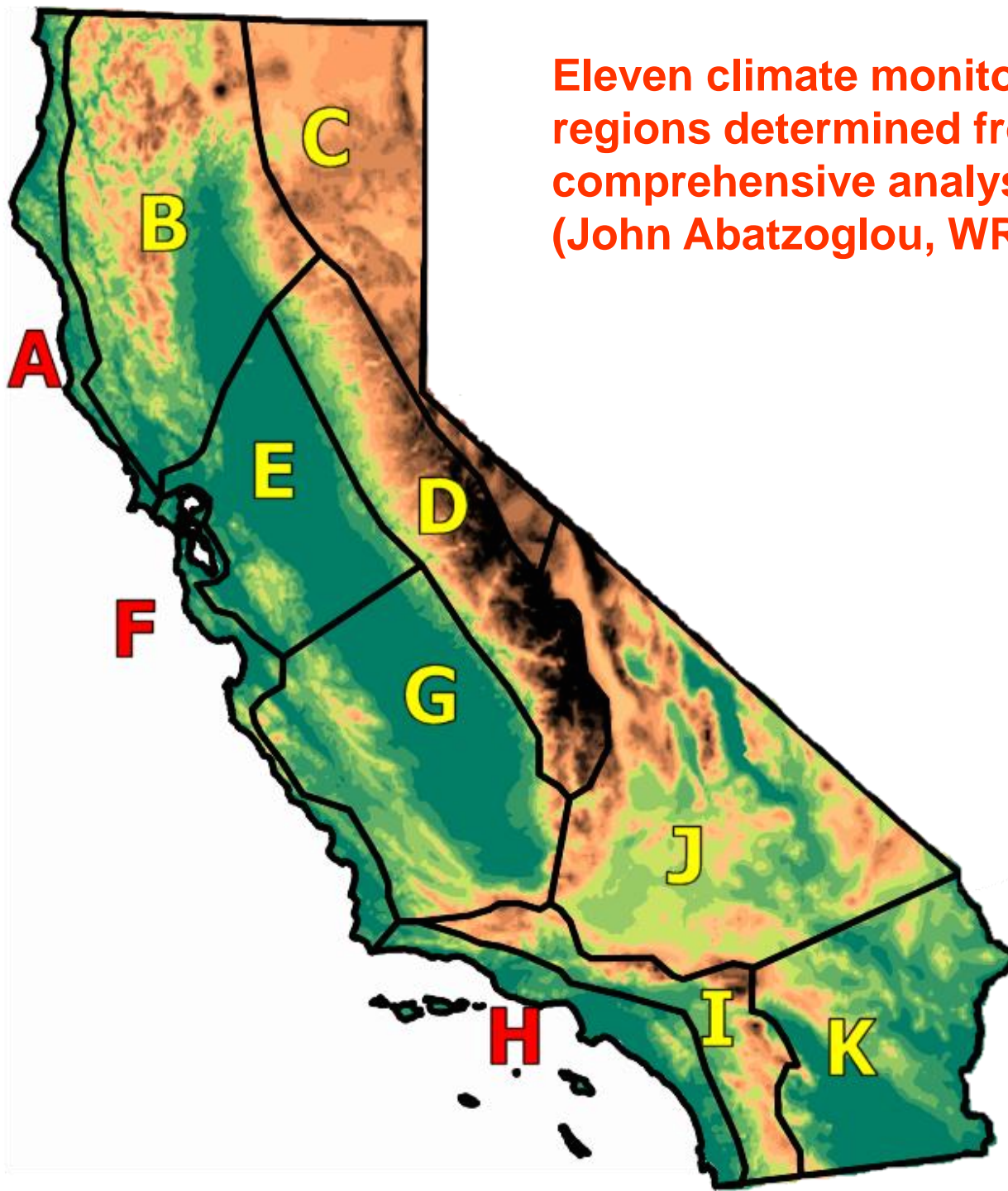
MARCH 2011

www.wrcc.dri.edu



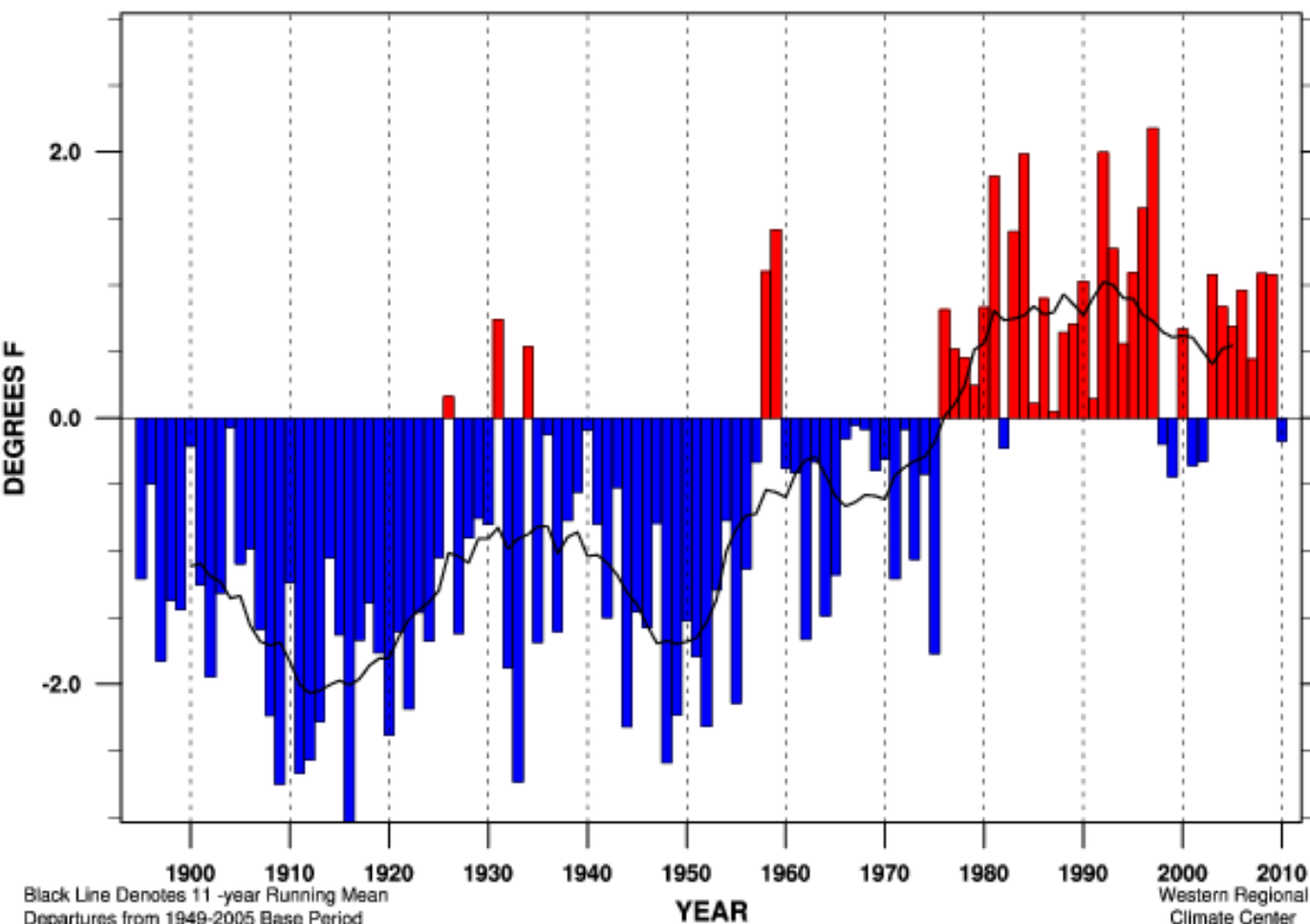
Updated by
John
Abatzoglou

Eleven climate monitoring
regions determined from a
comprehensive analysis.
(John Abatzoglou, WRCC)



South Coast Region

Mean Temperature Departure Jan-Dec



Annual
Temperature
Departure

South
Coast

1895-2010

Linear Trend 1895-present

$+ 2.47 \pm 0.49^{\circ}\text{F}/100\text{yr}$

Linear Trend 1949-present

$+ 3.84 \pm 1.26^{\circ}\text{F}/100\text{yr}$

Linear Trend 1975-present

$+ 0.50 \pm 2.64^{\circ}\text{F}/100\text{yr}$

Warmest Year

63.5 °F (+ 2.2 °F) in 1997

MEAN 61.3 °F

Coldest Year

58.3 °F (- 3.0 °F) in 1916

STDEV 1.13 °F

Jan-Dec

2010

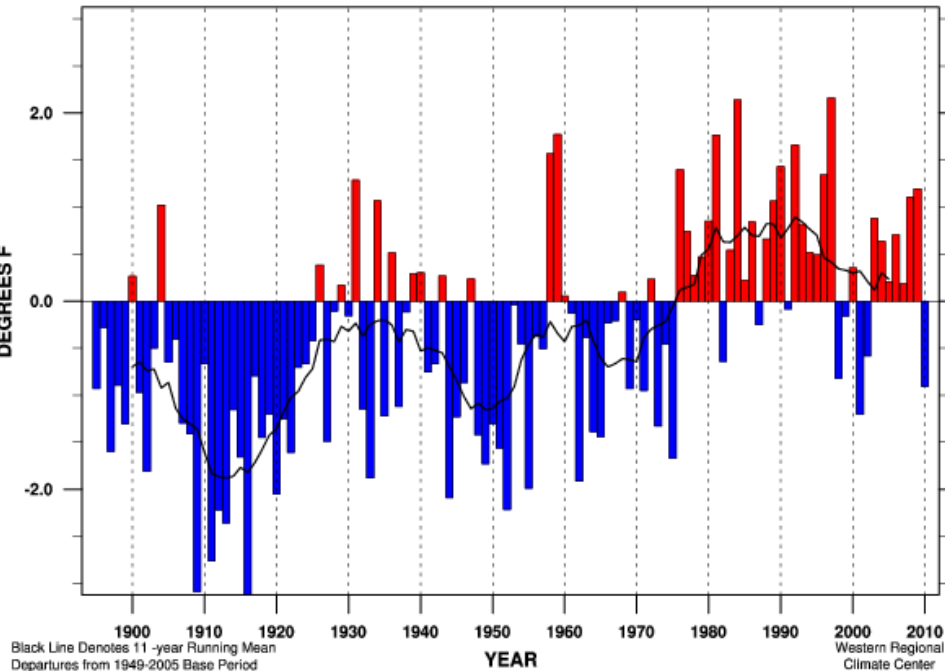
61.2 °F (- 0.2 °F)

RANK 75 of 116

Annual Temperature Departure South Coast 1895 thru 2010

Maximum Temp

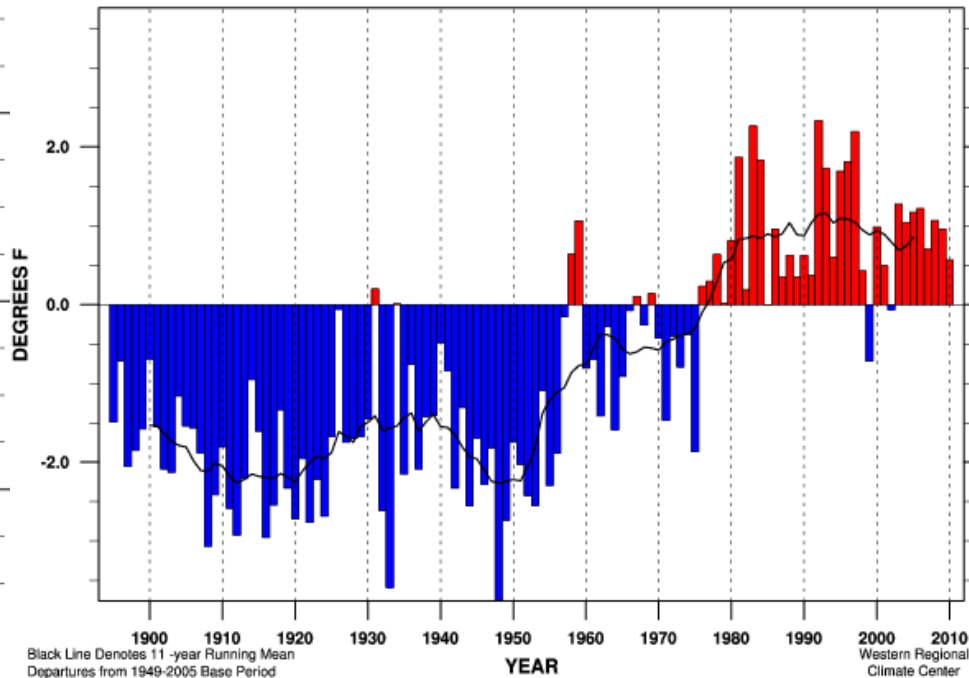
South Coast Region
Maximum Temperature Departure Jan-Dec



Linear Trend 1895-present	+ 1.74 ± 0.53°F/100yr	
Linear Trend 1949-present	+ 2.69 ± 1.38°F/100yr	
Linear Trend 1975-present	- 0.75 ± 2.94°F/100yr	
Warmest Year	75.5 °F (+ 2.2 °F) in 1997	MEAN 73.3 °F
Coldest Year	70.2 °F (- 3.1 °F) in 1916	STDEV 1.09 °F
Jan-Dec	2010	72.4 °F (- 0.9 °F) RANK 41 of 116

Minimum Temp

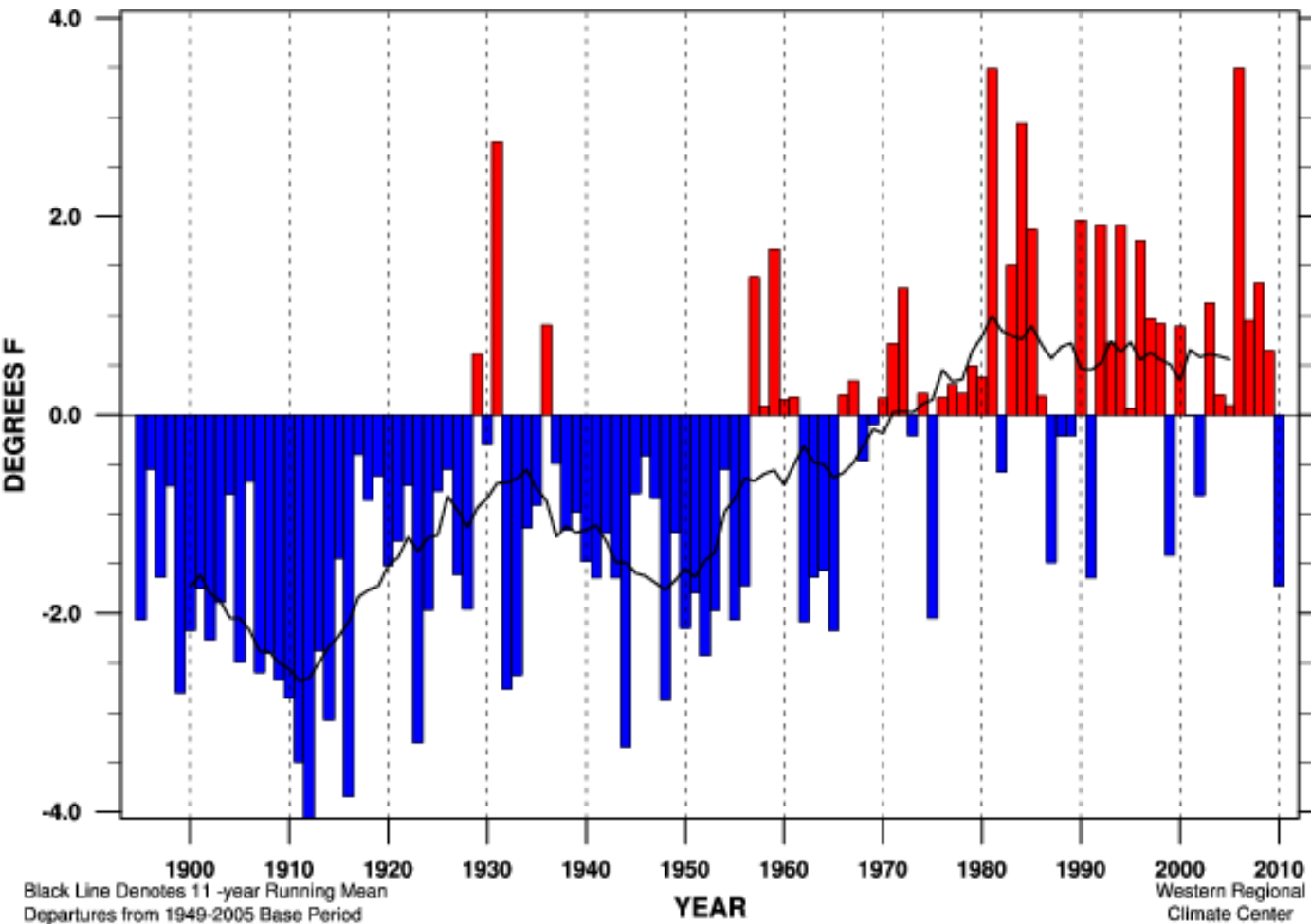
South Coast Region
Minimum Temperature Departure Jan-Dec



Linear Trend 1895-present	+ 3.19 ± 0.53°F/100yr	
Linear Trend 1949-present	+ 5.00 ± 1.29°F/100yr	
Linear Trend 1975-present	+ 1.76 ± 2.74°F/100yr	
Warmest Year	51.7 °F (+ 2.3 °F) in 1992	MEAN 49.4 °F
Coldest Year	45.6 °F (- 3.8 °F) in 1948	STDEV 1.29 °F
Jan-Dec	2010	50.0 °F (+ 0.6 °F) RANK 92 of 116

South Coast Region

Mean Temperature Departure Jun-Aug



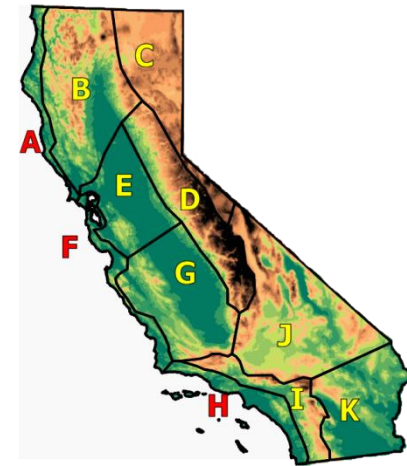
Linear Trend 1895-present	$+ 2.83 \pm 0.68^{\circ}\text{F}/100\text{yr}$
Linear Trend 1949-present	$+ 3.44 \pm 1.83^{\circ}\text{F}/100\text{yr}$
Linear Trend 1975-present	$+ 0.45 \pm 4.48^{\circ}\text{F}/100\text{yr}$
Warmest Year	72.9 °F (+ 3.5 °F) in 1981
Coldest Year	65.3 °F (- 4.1 °F) in 1912
Jun-Aug 2010	67.6 °F (- 1.7 °F)

MEAN 69.4 °F
STDEV 1.44 °F
RANK 32 of 116

Summer
Jun-Jul-Aug
Temperature
Departure

South
Coast

1895-2010

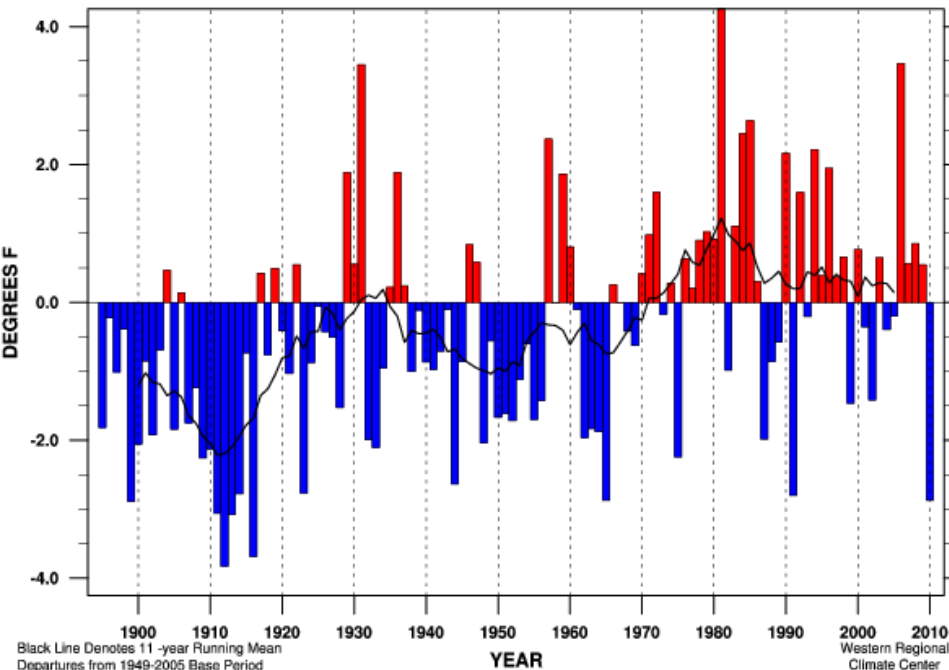


Summer Jun-Jul-Aug Temperature Departure South Coast 1895 thru 2009/10

Maximum Temp

Minimum Temp

South Coast Region
Maximum Temperature Departure Jun-Aug



Linear Trend 1895-present + 1.81 ± 0.79 °F/100yr

Linear Trend 1949-present + 2.07 ± 2.15 °F/100yr

Linear Trend 1975-present - 1.72 ± 5.33 °F/100yr

Warmest Year 85.9 °F (+ 4.3 °F) in 1981

Coldest Year 77.8 °F (- 3.8 °F) in 1912

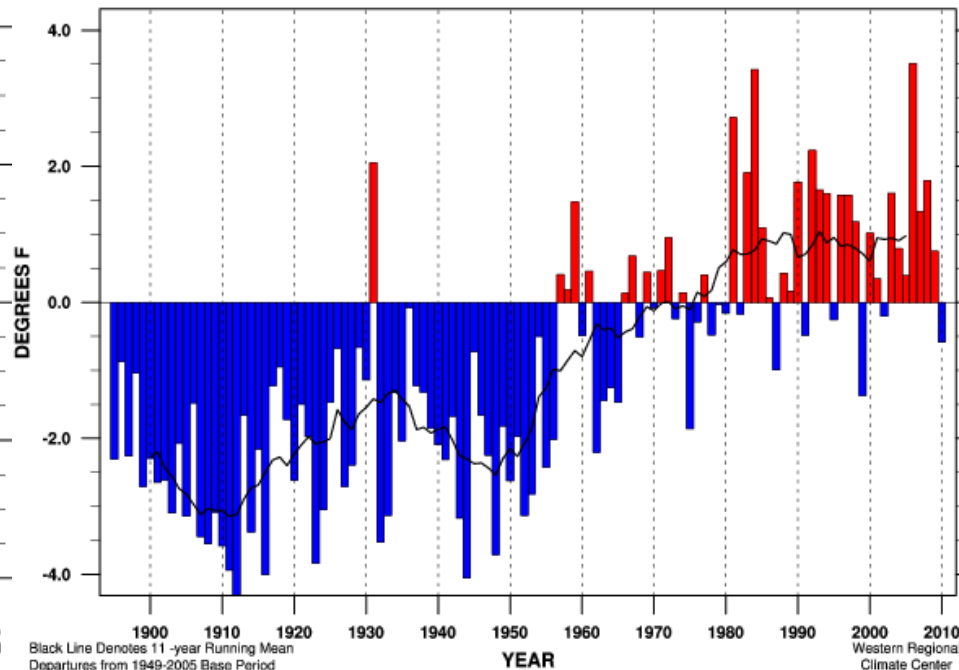
Jun-Aug 2010 78.8 °F (- 2.9 °F)

MEAN 81.6 °F

STDEV 1.55 °F

RANK 7 of 116

South Coast Region
Minimum Temperature Departure Jun-Aug



Linear Trend 1895-present + 3.86 ± 0.67 °F/100yr

Linear Trend 1949-present + 4.82 ± 1.68 °F/100yr

Linear Trend 1975-present + 2.63 ± 4.01 °F/100yr

Warmest Year 60.6 °F (+ 3.5 °F) in 2006

Coldest Year 52.8 °F (- 4.3 °F) in 1912

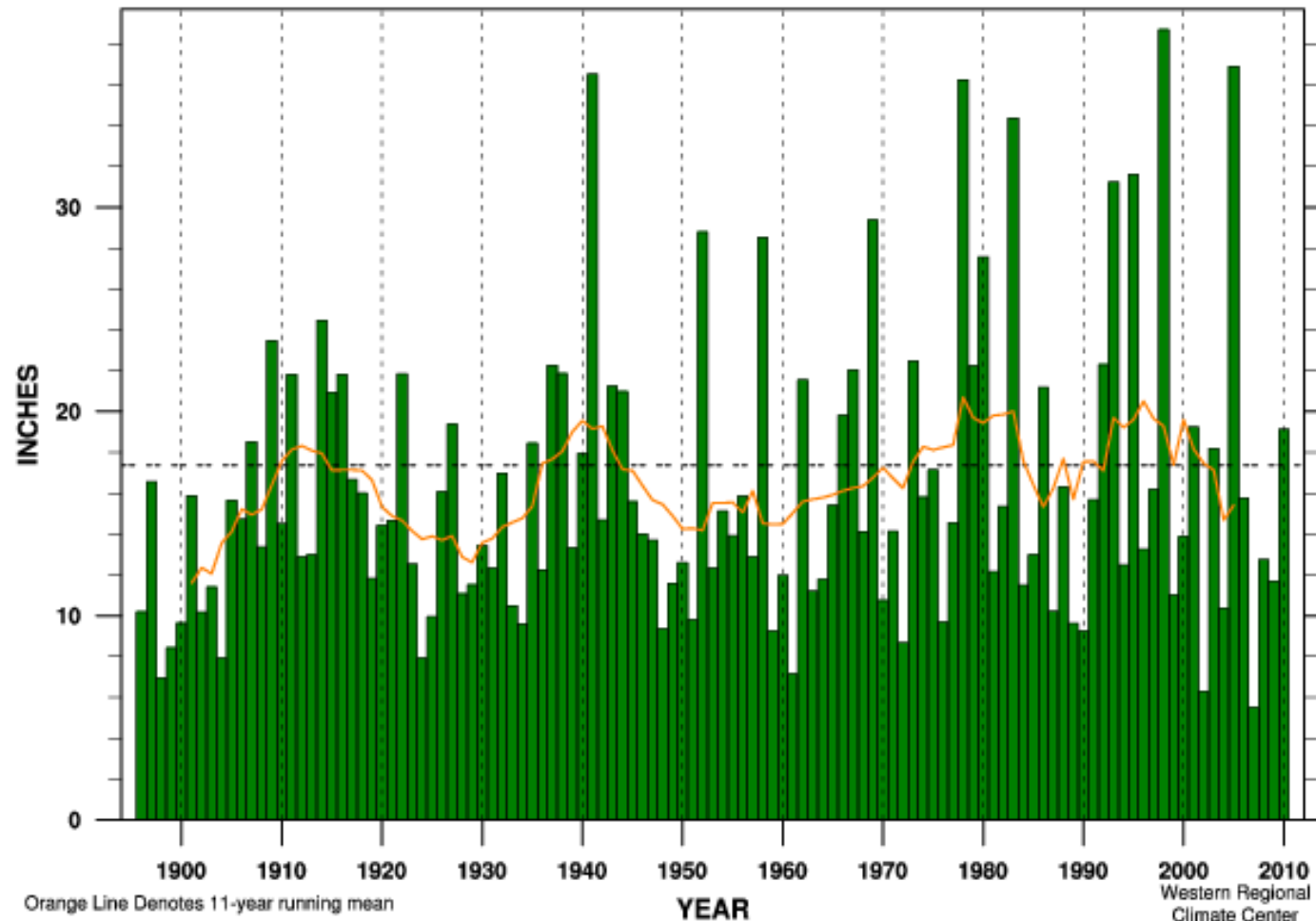
Jun-Aug 2010 56.5 °F (- 0.6 °F)

MEAN 57.1 °F

STDEV 1.48 °F

RANK 67 of 116

South Coast Region Precipitation Jul-Jun

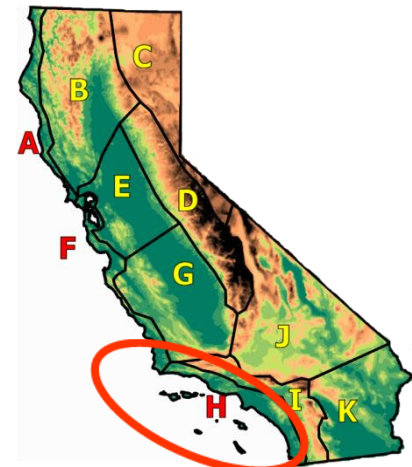


Linear Trend 1895-present	+ 3.51 ± 3.82 in.	(+ 20 ± 21%) per 100 yr	
Linear Trend 1949-present	+ 3.18 ± 11.75 in.	(+ 18 ± 67%) per 100 yr	
Linear Trend 1975-present	-11.67 ± 31.24 in.	(- 67 ± 179%) per 100 yr	
Wettest Year	38.71 in. (222%) in 1998	MEAN	17.38 in.
Driest Year	5.49 in. (31%) in 2007	STDEV	8.11 in.
Jul-Jun	2010	RANK	85 of 115

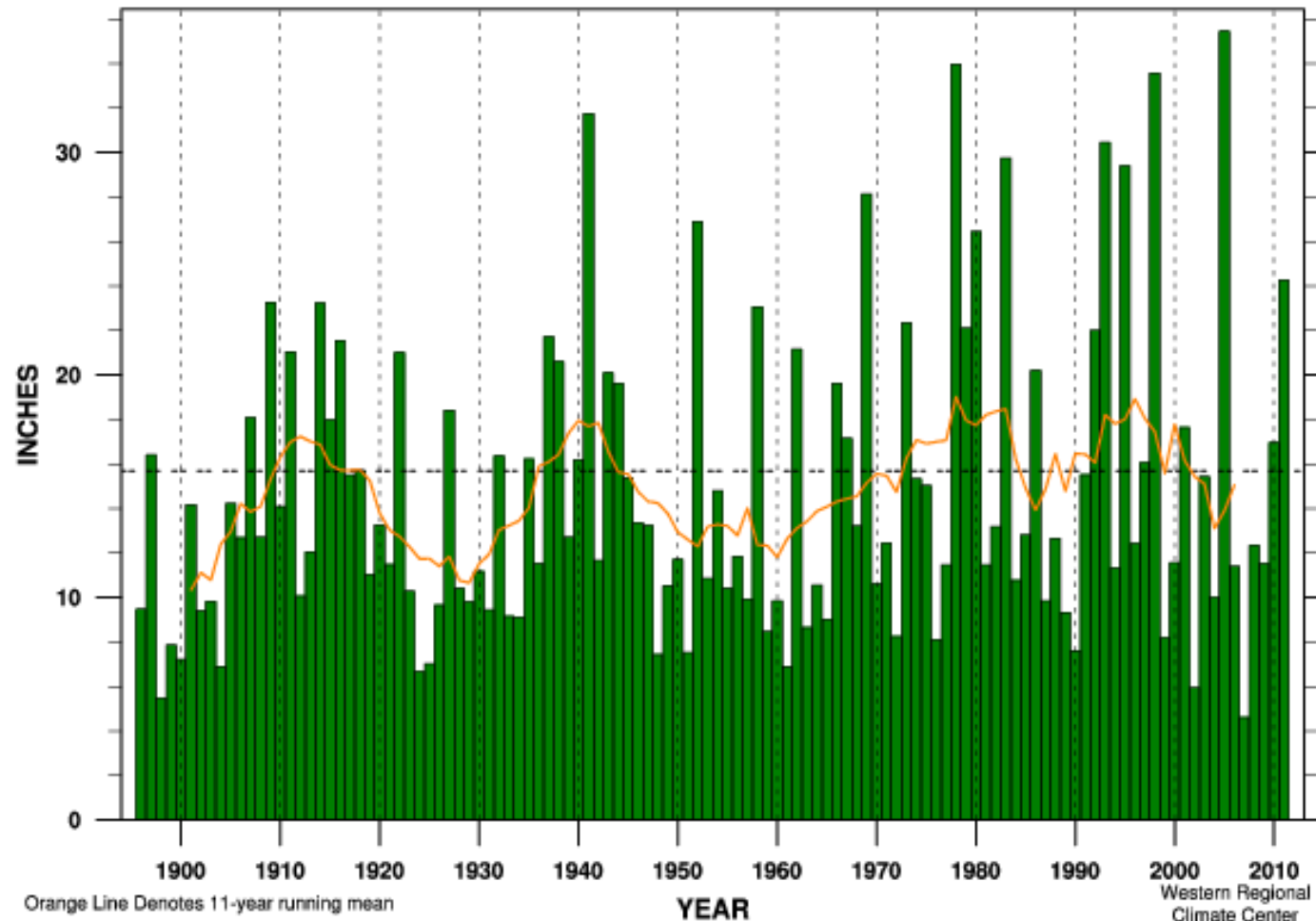
**Water Year
Oct-Sep
Precip**

**South
Coastal
California**

**1895-96
thru
2009-10**



South Coast Region Precipitation Jul-Mar



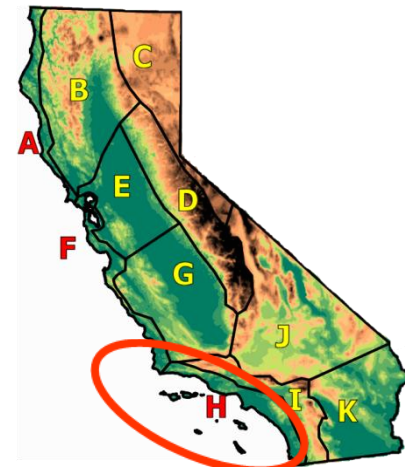
Linear Trend 1895-present	+ 3.61 ± 3.64 in.	(+ 23 ± 23%) per 100 yr	
Linear Trend 1949-present	+ 5.50 ± 10.92 in.	(+ 35 ± 69%) per 100 yr	
Linear Trend 1975-present	- 7.13 ± 28.35 in.	(- 45 ± 180%) per 100 yr	
Wettest Year	35.45 in. (225%) in 2005	MEAN	15.69 in.
Driest Year	4.61 in. (29%) in 2007	STDEV	7.78 in.
Jul-Mar 2011	24.28 in. (154%)	RANK	106 of 116

July-March

Precip

South
Coastal
California

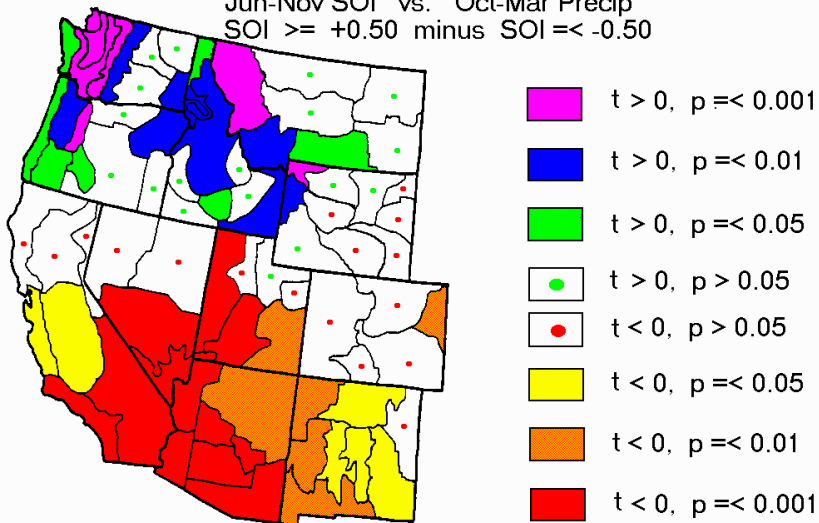
1895-96
thru
2010-11





Split Samples:

Jun-Nov SOI vs. Oct-Mar Precip
SOI $\geq +0.50$ minus SOI ≤ -0.50



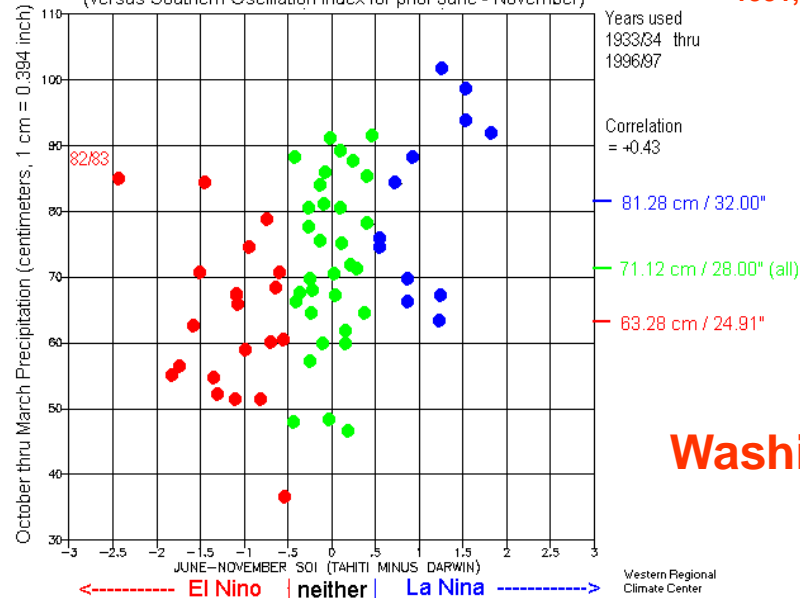
Updated from Redmond and Koch (1991). Winters of 1933/34 - 1994/95.
Reddish: Composite El Nino winters are wet, La Nina winters are dry.
Bluish/greenish: Composite El Nino winters are dry, La Nina winters are wet.

Redmond, K.T., and R.W. Koch, 1991. Surface climate and streamflow variability in the western United States and their relationship to large-scale circulation indices. Water Resources Research, 27(9), 2381-2399.

Redmond & Koch, 1991, updated.

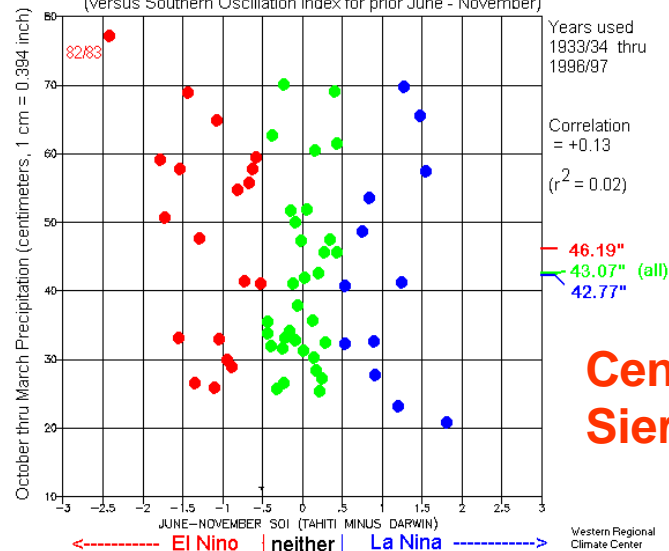
ENSO

Washington statewide October thru March Precipitation (versus Southern Oscillation Index for prior June - November)



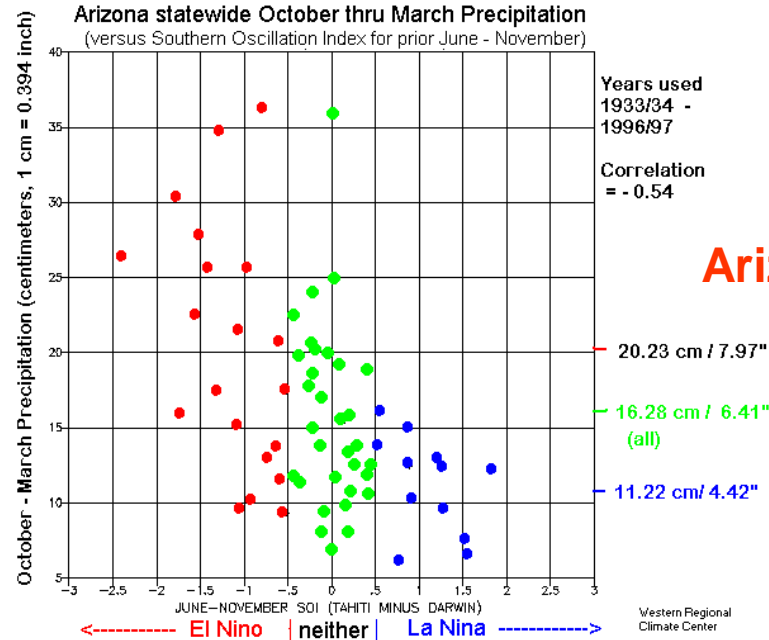
Washington

California 8-Station Index October thru March Precipitation (versus Southern Oscillation Index for prior June - November)



Central Sierra

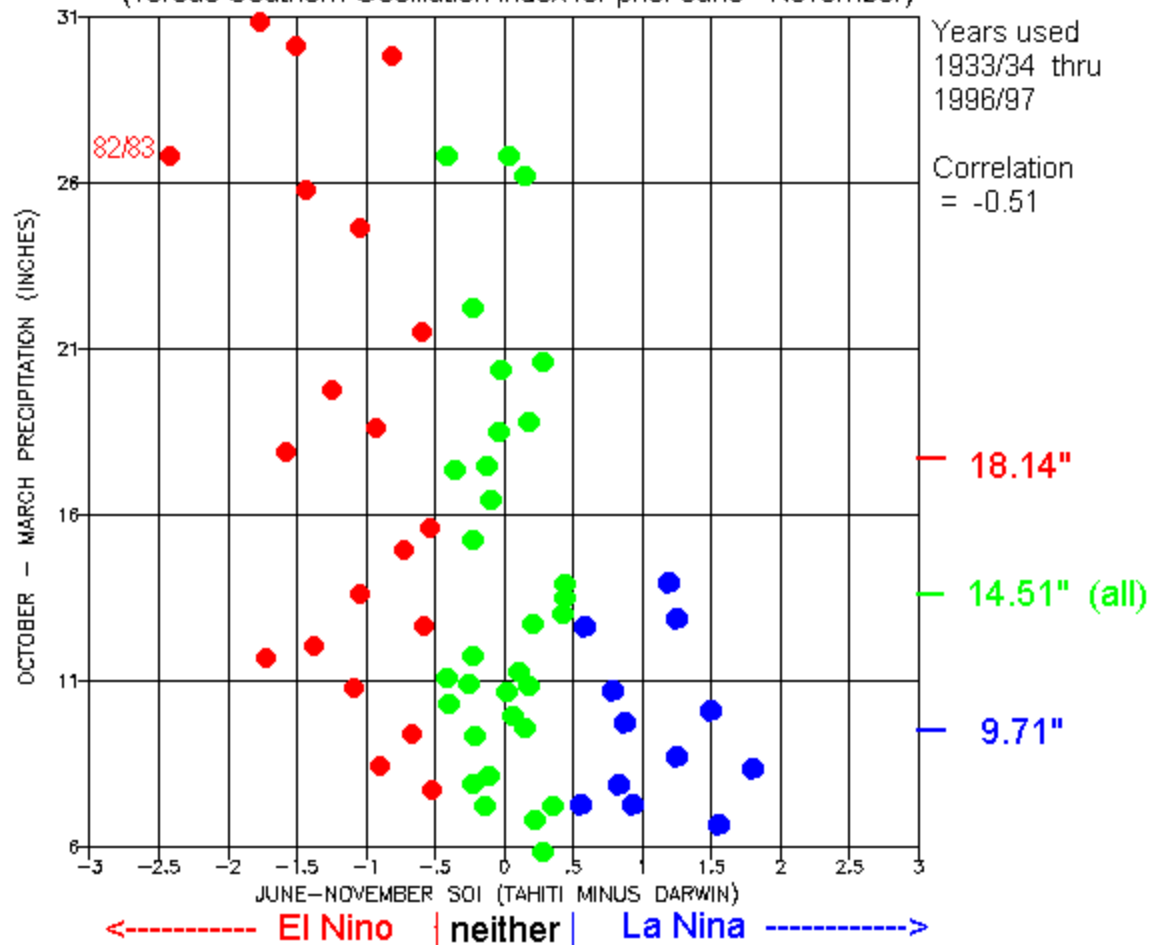
Arizona statewide October thru March Precipitation (versus Southern Oscillation Index for prior June - November)



Arizona

South Coast California October thru March Precipitation

(versus Southern Oscillation Index for prior June - November)



WRCC

p.s.

South Coast California

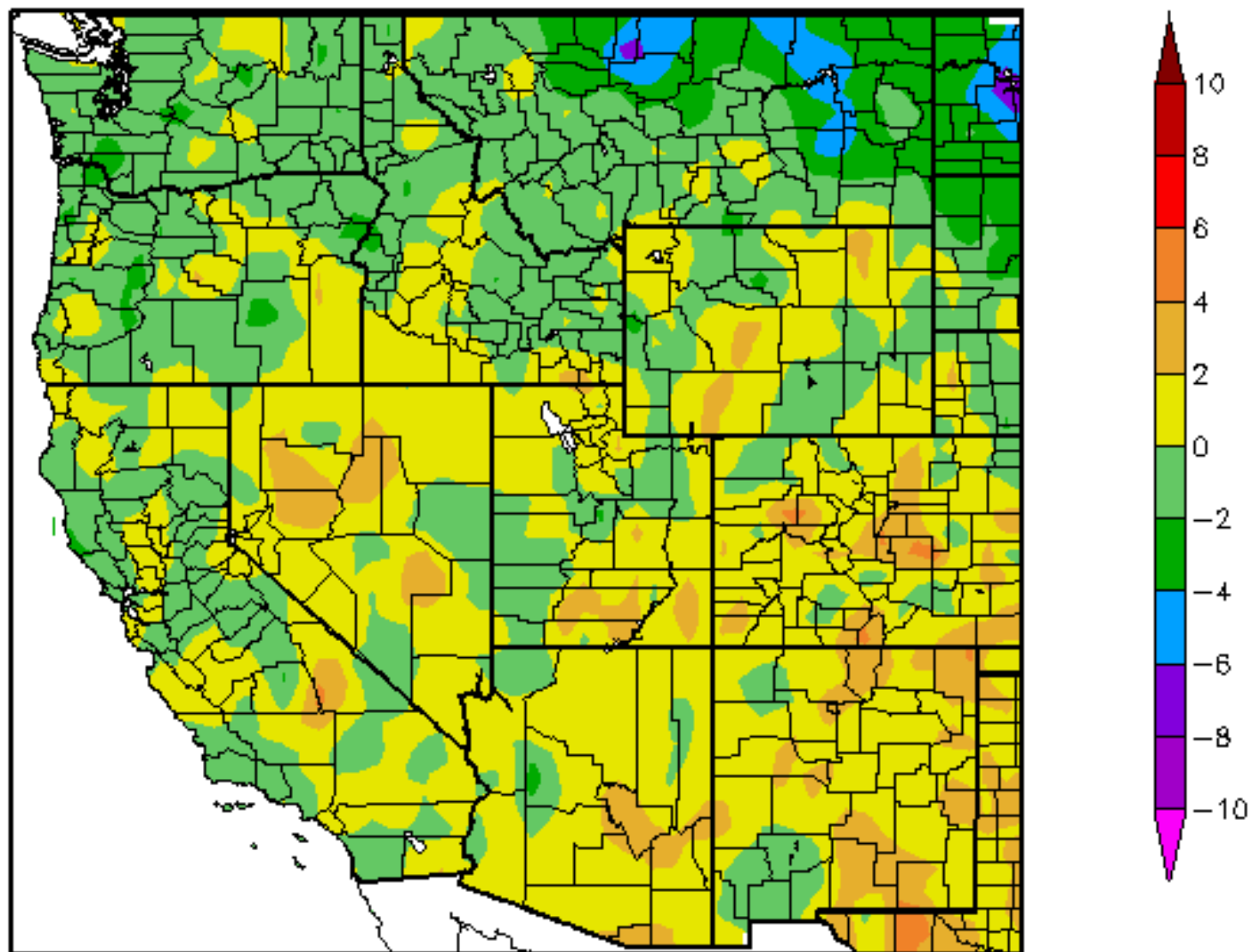
Has never (=64 years)
had a wet La Nina winter

Departure from Normal Temperature (F) 10/1/2010 – 4/25/2011

Temperature
Departure

Water Year
to Date

01 Oct 2010
through
25 Apr 2011

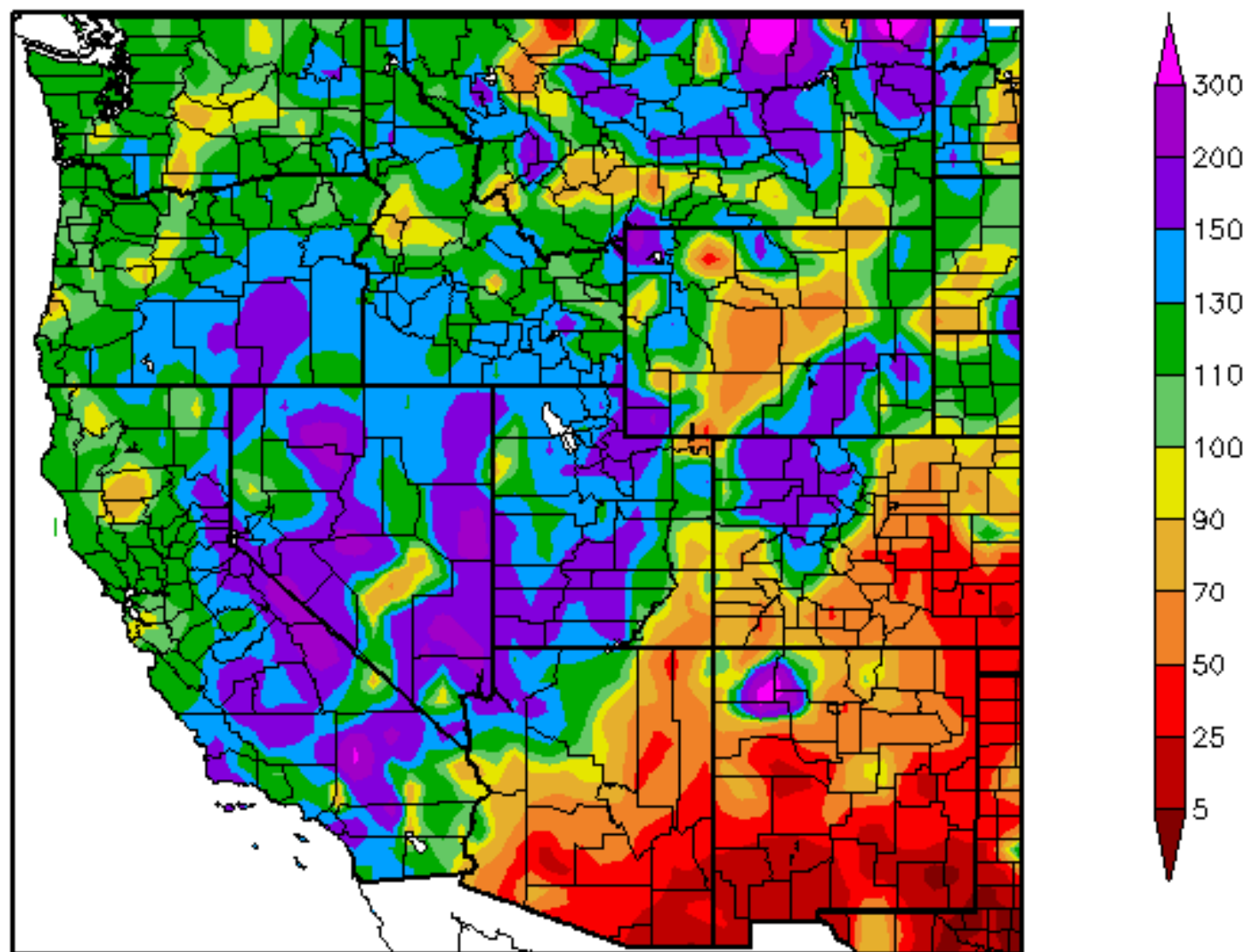


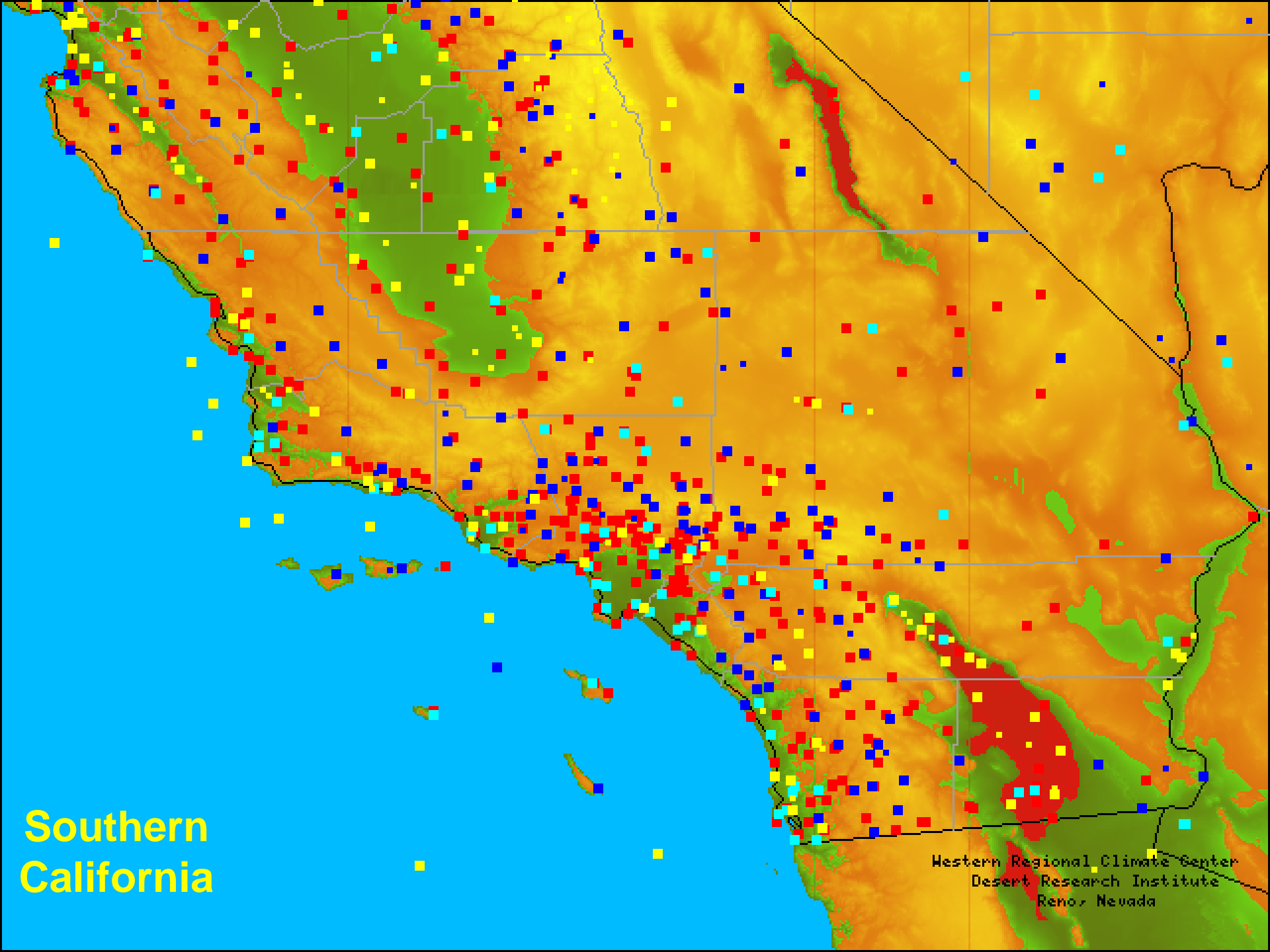
**Water Year
Precipitation**

**01 Oct 2010
Thru
25 April 2011**

**Percent of
Average**

Percent of Normal Precipitation (%)
10/1/2010 – 4/25/2011





**Southern
California**

Western Regional Climate Center
Desert Research Institute
Reno, Nevada

Santa Catalina Island Climate Stations



WRCC Web Pages

www.wrcc.dri.edu/PROJECTS.html

Click on site of interest for more information.
Data are subject to review and verification.

[Composite Daily Summaries](#)

Cooperating Agencies:



[Catalina Island
Conservancy](#)

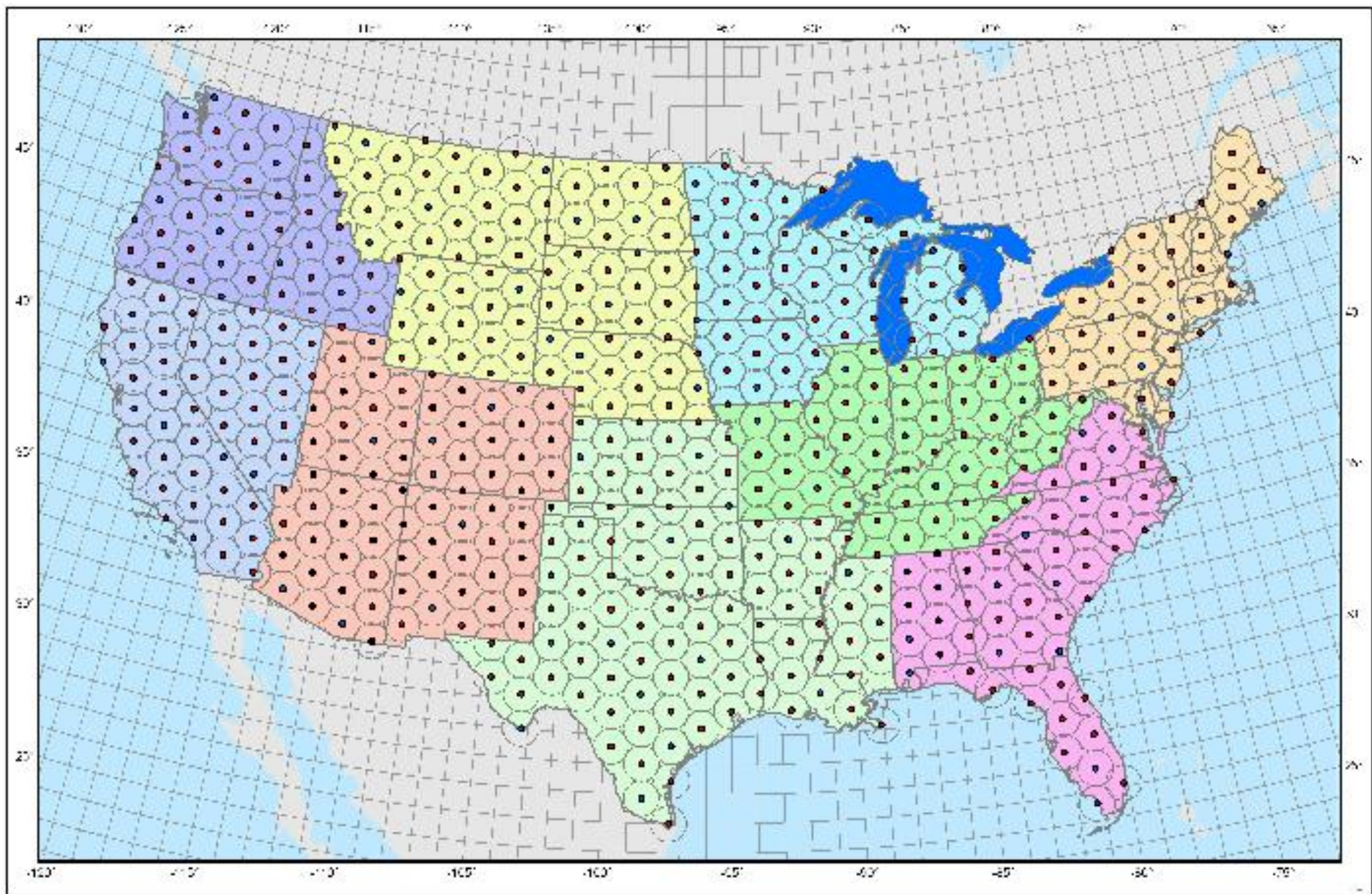


[Desert Research Institute](#)

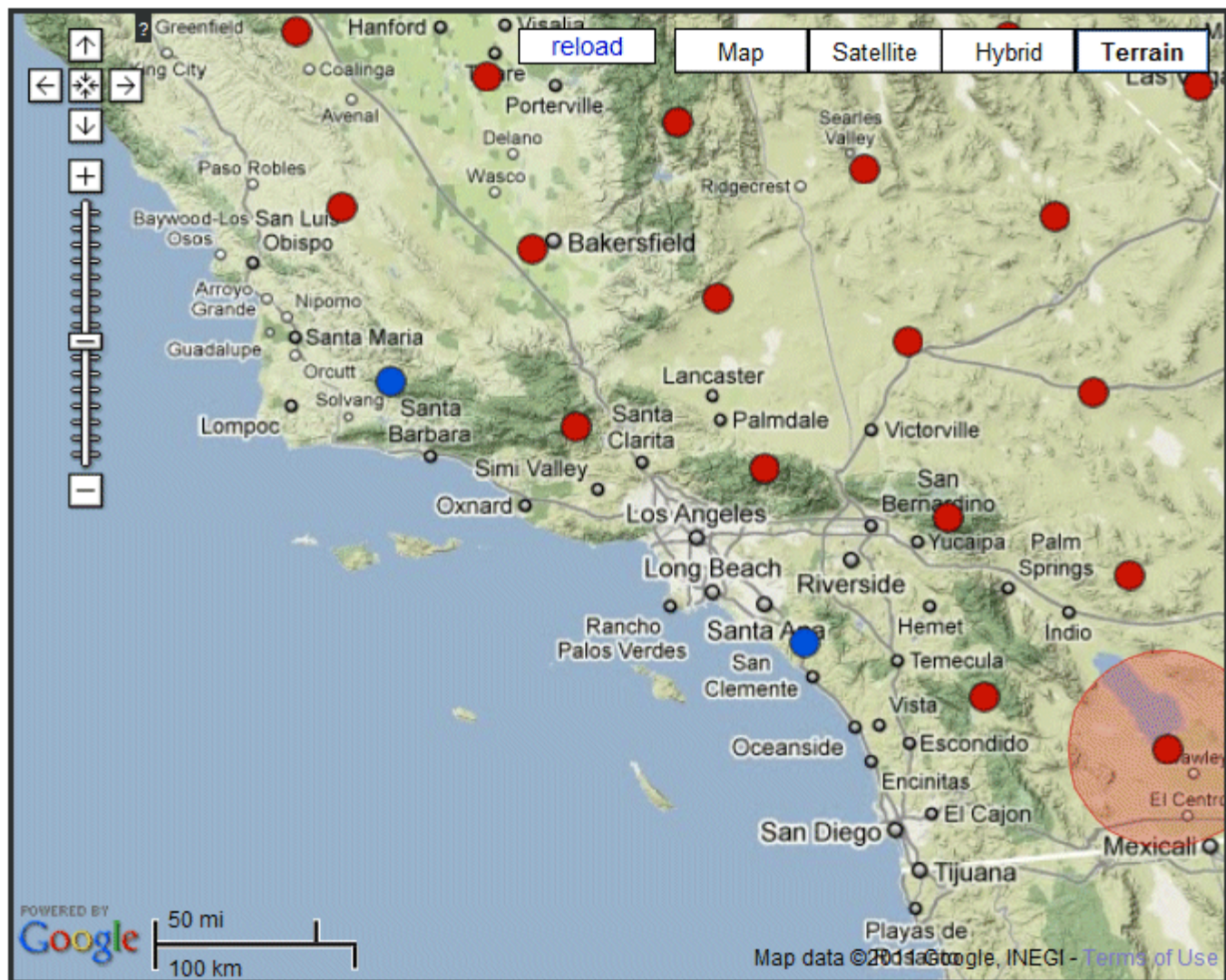


[Western Regional
Climate Center](#)

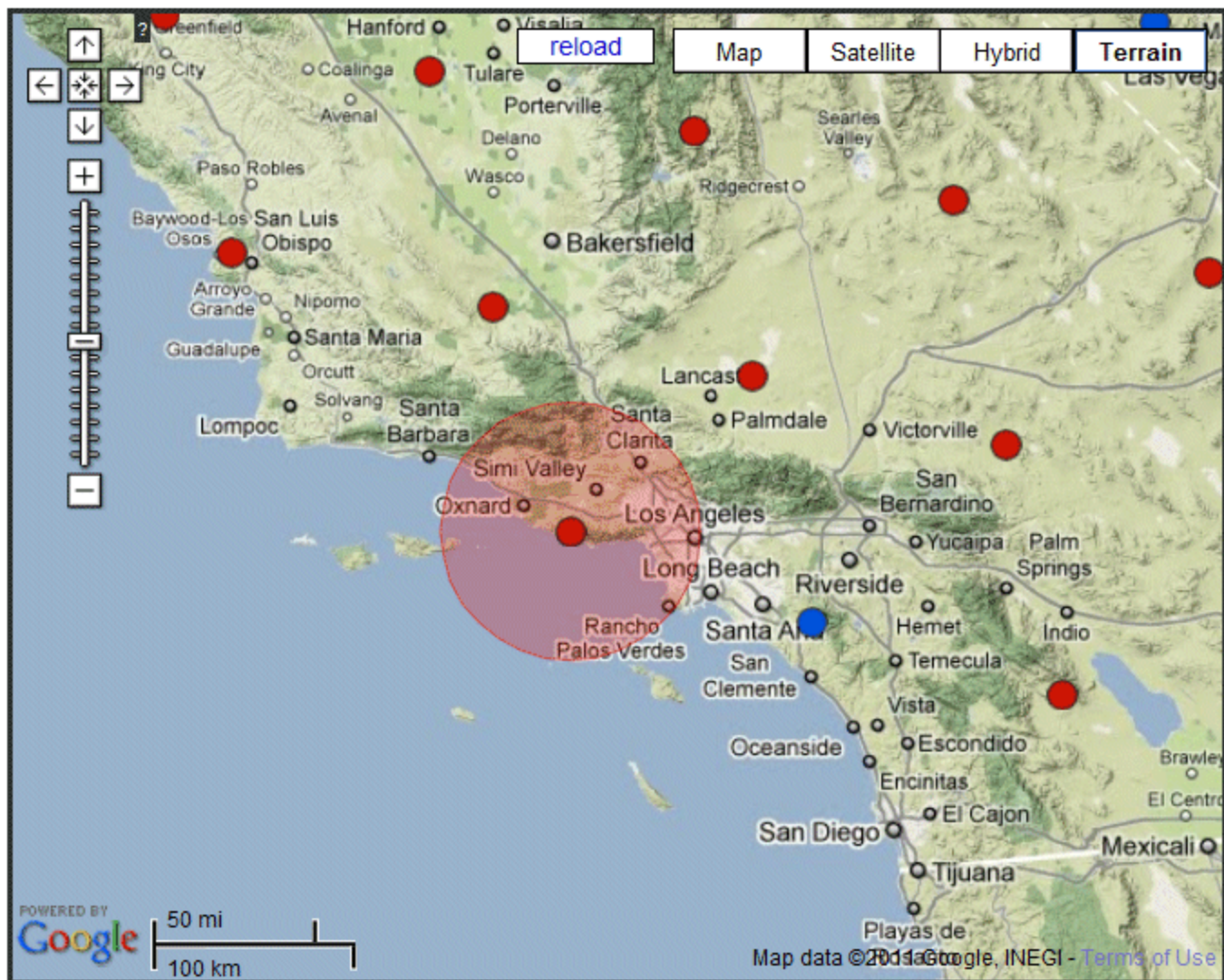
2010 Revised HCN-M grid, now called US RCRN (US Regional Climate Reference Network)
Originally planned for 1000 stations, now revised to 538 stations.



US Regional Climate Reference Stations 50-km grid

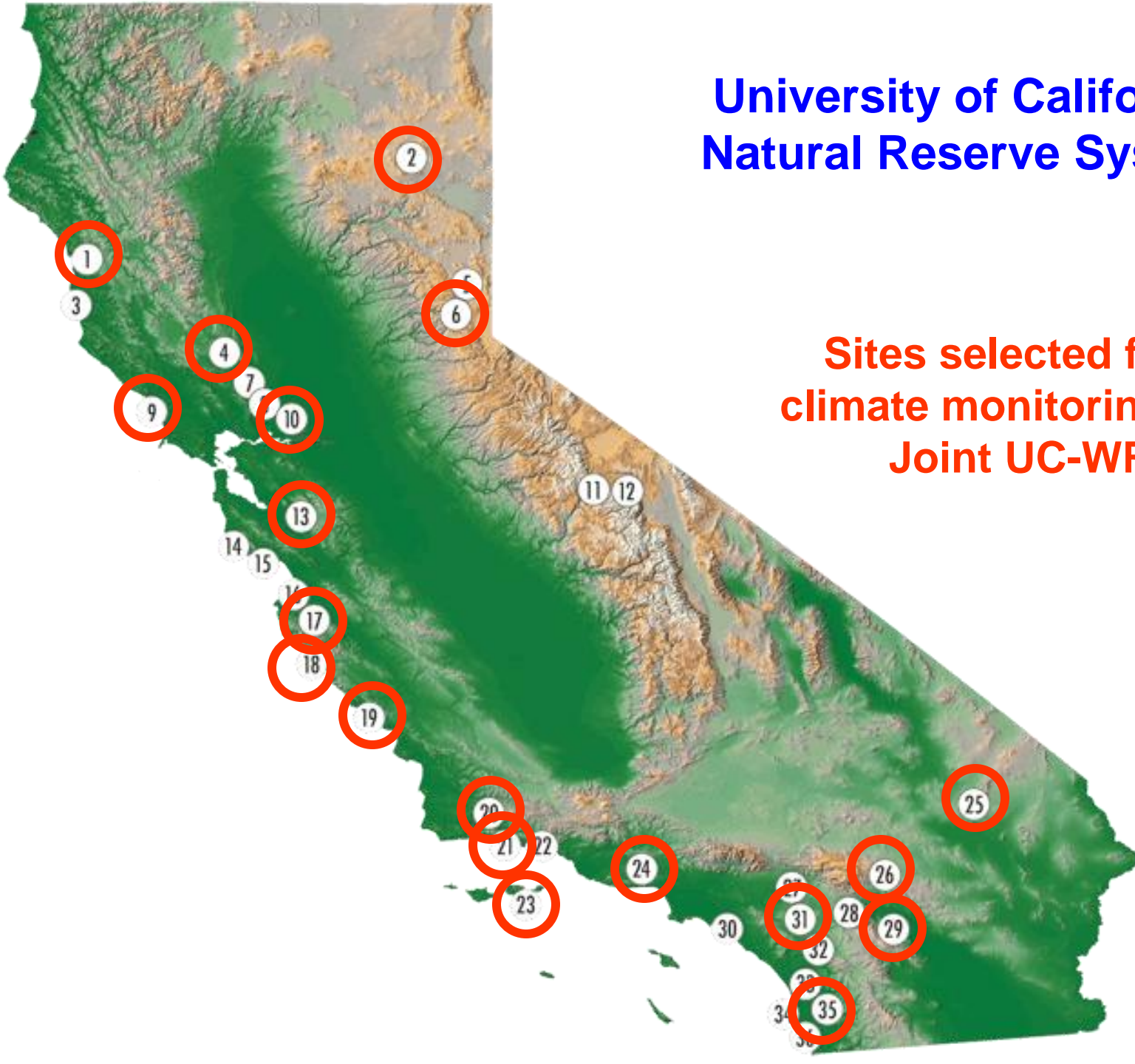


US Regional Climate Reference Stations 65-km grid



University of California Natural Reserve System

Sites selected for NSF
climate monitoring project
Joint UC-WRCC



Memory jogger

Reserve Name	Area (ha/ac.)	Plant Community	Elevation (m/ft.)	Reserve Administration
Angelo Coast Range Reserve	1,748 / 4,320	Redwoods, mixed conifer, Douglas Fir forests, meadows.	378 - 1,290 / 1,240 - 4,231	Prof. Mary Power mepower@berkeley.edu
Chickering American River Reserve	6,829 / 16,875	Montane subalpine coniferous forests, aspen groves, meadows.	1,830 - 2,470 / 6,000 - 8,100	Jeff Browne sagehen@berkeley.edu
Hastings Natural History Reservation	960 / 2,373	Coast range interior blue oak, valley oak woodlands, annual grassland, riparian	467 - 953 / 1,530 - 3,125	Mark Stromberg, Ph.D. stromberg@berkeley.edu
Blue Oak Ranch Reserve	1,319 / 3,259	Valley oak and blue oak woodlands, annual grasslands, riparian corridors.	454 - 870 / 1,489 - 2,855	Michael Hamilton, Ph.D. mphamilton@berkeley.edu
Bodega Marine Reserve	221 / 545	Coastal scrub, coastal prairie, active and stabilized dunes, marine coast.	0 - 190 / 0 - 60	Jackie Sones jlsones@ucdavis.edu
Jepson Prairie Reserve	634 / 1,566	Sacramento Valley remnant native prairie, vernal pools, annual grasslands.	2 - 8 / 5 to 25	Virginia Boucher, Ph.D. vlboucher@ucdavis.edu
McLaughlin Natural Reserve	2,853 / 7,050	Serpentine grasslands, shrublands and oak woodlands. Riparian corridors.	366 - 732 / 1,200 - 2,400	Kathi Koehler, Ph.D. mclaughlin@ucdavis.edu
Burns Piñon Ridge Reserve	124 / 306	Mohave and Sonoran Desert; piñon-juniper woodland, desert wash	1,080 - 1,300 / 3,540 - 4,260	William Bretz wlbretz@UCI.edu
Stunt Ranch	125 / 310	Santa Monica Mountain coast live oak woodland, chaparral, riparian corridor	392 - 472 / 1,285 - 1,550	Carol Felixson cfelixso@ucla.edu
Boyd Deep Canyon	6,737 / 16,647	Desert wash, higher- piñon-juniper woodland, Joshua trees, desert wash	9 - 2,657 / 30 - 8,716	Al Muth, Ph.D. deepcanyon@mindspring.co
Motte Rimrock Reserve	289 / 715	Riversidean Coastal Sage Scrub and annual grassland.	482 - 605 / 1,581 - 1,985	Formatted Table kjhalama@ucr.edu
Sweeney Granite Mountains	3,496 / 8,639	East Mojave Desert, bajadas with creosote scrub	1,128 - 2,070 / 3,700 - 6,796	Jim Andre, Ph.D. granites@telis.org
Elliott Chaparral Reserve	43 / 107	San Diego coastal desert, mesa edges, coastal chaparral	61 - 305 / 200 - 1,000	Isabelle Kay ikay@ucsd.edu
Coal Oil Point Natural Reserve	69 / 170	Coastal beach strand, estuary, dunes	0 - 12 / 0 - 40	Cristina Sandoval, Ph.D. sandoval@lifesci.ucsb.edu
Rancho Marino Reserve	202 / 500	Rocky shoreline, coastal grasslands, Monterey pine and coast live oak forest	0 - 216 / 0 - 702	Don Canestro canestro@lifesci.ucsb.edu
Santa Cruz Island Reserve	18,624 / 46,020	sage scrub, chaparral, grasslands, oak/pine woodlands,	0 to 742 / 0 - 2,434	Lyndal Laughrin laughrin@lifesci.ucsb.edu
Sedgwick Reserve	2,388 / 5,900	Inland coast live oak forest, blue oak woodland, valley oak savannah,	290 - 790 / 950 - 2,600	and Kate McCurdy, Ph.D. mccurdy@lifesci.ucsb.edu
Valentine Camp / VESR	62 / 154	Sierran upper-montane forest and Great Basin sagebrush	2,437 to 2,605 m (7,994 to 8,545 ft)	Dan Dawson dawson@icess.ucsb.edu
Landels-Hill Big Creek Reserve	1,584 ha (3,911 acres);	Redwood forest, coastal grasslands, oak woodlands, pine-oak forest.	0 to 1,220 m (0 to 4,000 ft)	Mark Readdie, Ph.D. readdie@biology.ucsc.edu

Do Microenvironments Govern Macroecology ? NSF UCSB, UCB, UCLA, UCR, ASU, DRI

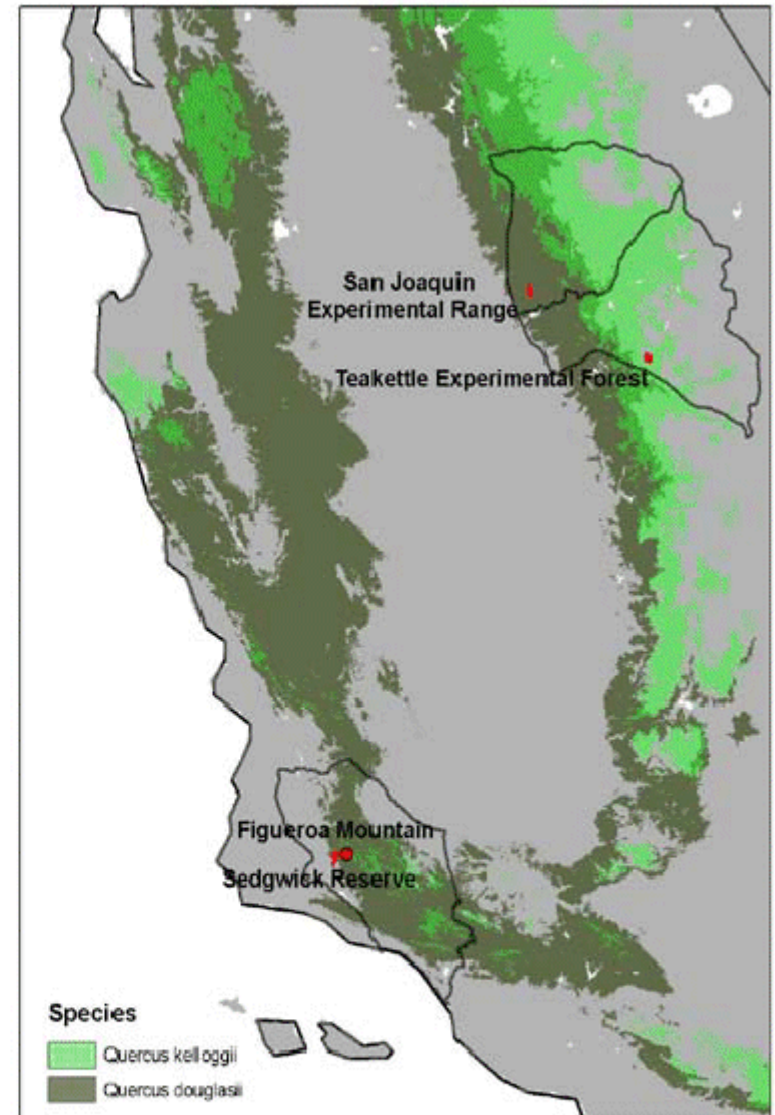
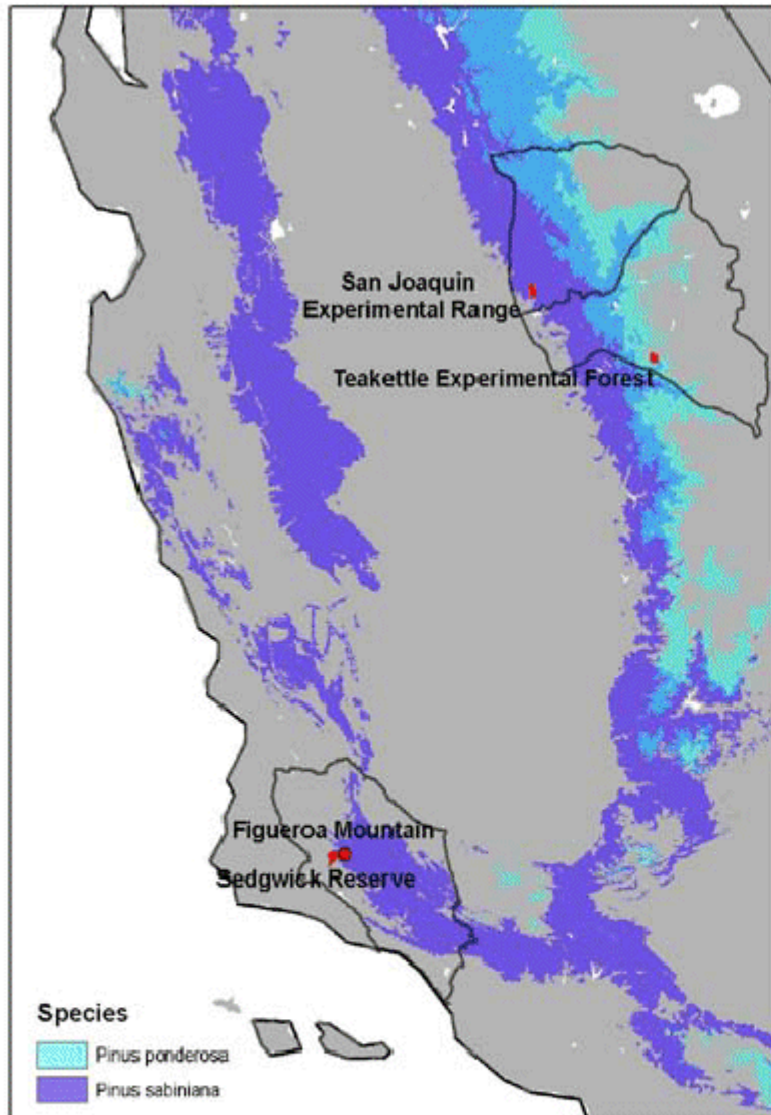


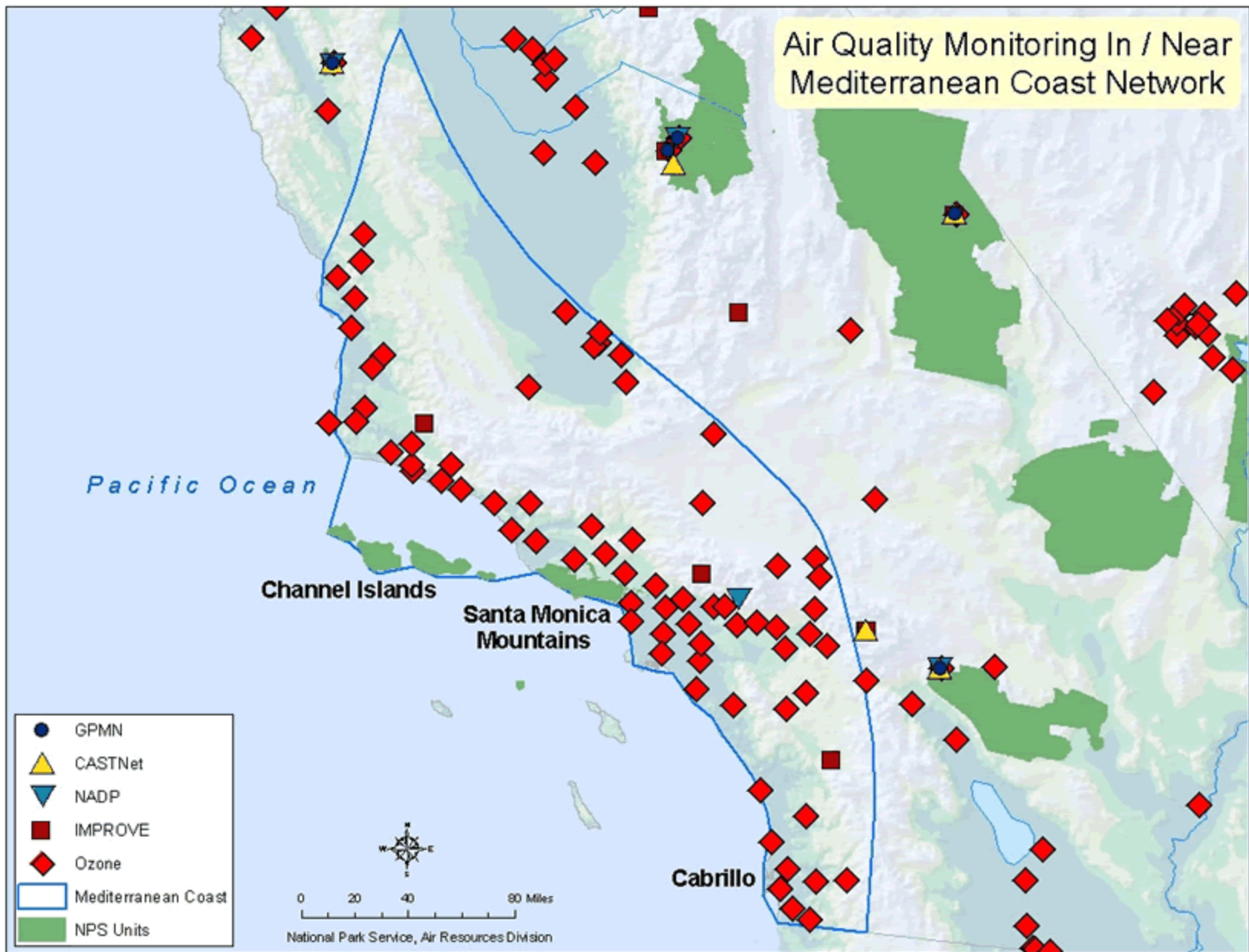
Figure 2. Location map of study areas with predicted current distributions of *Pinus* (left) and *Quercus* (right) target species. Color gradient denotes distribution of individual species as well as overlap. Experimental plot locations are shown in red and seed zone modeling domains are outlined in black.



Sedgewick UC Reserve

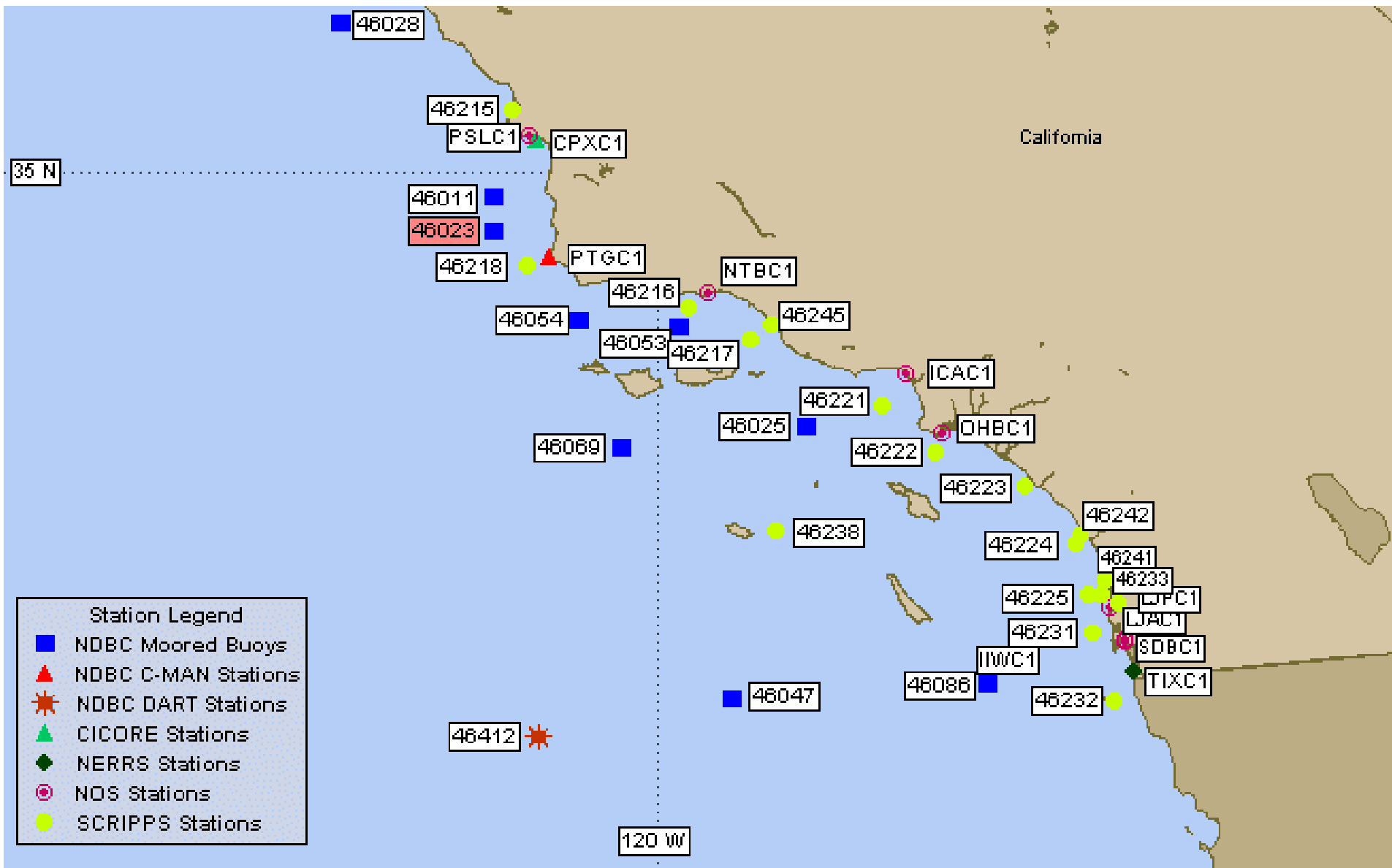


Air Quality Monitoring in Southern California.



Source: NPS MEDN

Buoys - National Data Buoy Center



All NOAA buoy data online at WRCC until a format and system change at NDBS in 2006. Needs a re-write of ingest code to restart this automated flow.

NDBS NOAA 3-m Buoy



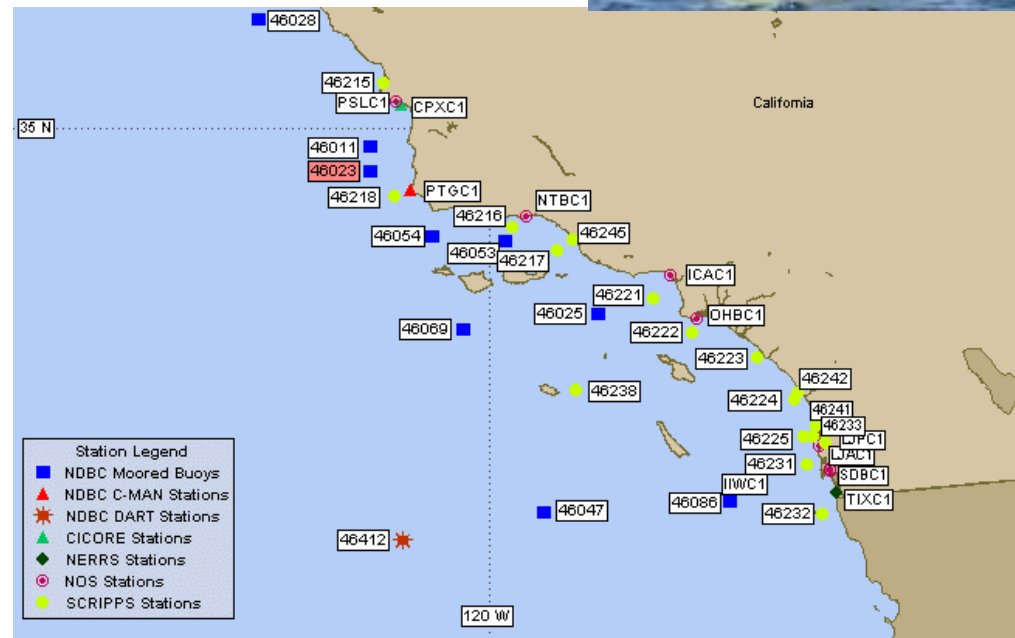
Scripps Waverider Buoy

NDBS Currently Reporting (Yellow)



Large icon indicates selected station. [Disclaimer](#)

- ◆ Stations with recent data
- ◆ Stations with no data in last 8 hours (24 hours for tsunami stations)



SCCOOS

SOUTHERN CALIFORNIA COASTAL OCEAN OBSERVING SYSTEM

ABOUT DATA, PRODUCTS and MODELING PROJECTS CLASSROOM USERS HOME



Available Products

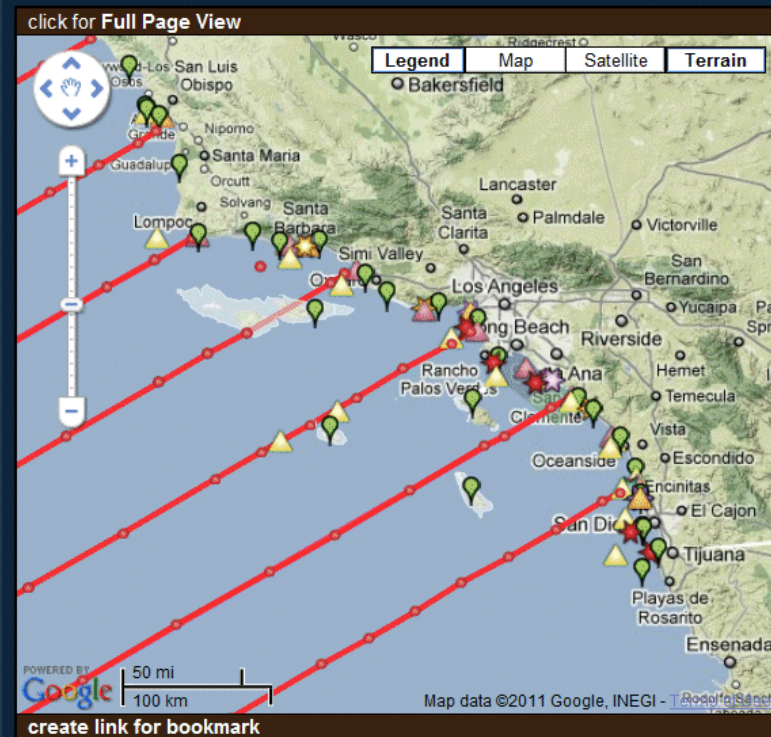
[ASBS Data](#)
[Automated Shore Stations](#)
[Bathymetry](#)
[Gliders](#)
[Harbors](#)
[Harmful Algae & Red Tides](#)
[Manual Shore Stations](#)
[Meteorological Observations](#)
[Moorings](#)
[Plume Tracking](#)
[ROMS Model Output](#)
[Satellite Imagery](#)
[Ship Tracking \(AIS\)](#)
[Ship Casts](#)
[Surface Current Mapping](#)
[Wave Conditions \(CDIP\)](#)
[Winds & Rainfall Forecasts](#)

[Grab Raw Data](#)

SCCOOS OBSERVATION MAP

← back to Data Products

Click on the legend button to toggle display of observation types on and off, or select items on the map for links to the data. You can also view the map in a large window by clicking on the Full Page View link below. To access data, click on an individual location on the map and navigate to the linked page, or follow a link from the Available Products menu at the left. For more information about how data is collected, visit the [About SCCOOS Technologies](#) page. To view these observation sites in Google Earth, visit [feeds](#).



LEGEND

Regions

- ☒ HAB Surveillance Area
- ☒ HAB Focus Area
- ☒ ASBS Regions

Stationary Observations

- ☒ Automated Shore Stations
- ☒ Manual Shore Stations
- ☒ CDIP Buoys
- ☒ Moorings

Ship Casts

- ☒ CalCOFI Lines
- ☒ CalCOFI Stations
- ☒ CalCOFI SCCOOS Stations

Water Quality

- ☒ Stream Gauges
- ☒ Outfall Sites
- ☒ Outfall Pipes
- ☒ Shoreline Water Quality
- ☒ Cast Water Quality
- ☒ Harmful Algal Blooms

Profiles

- ☒ Underway CTD
- ☒ Spray Gliders

Remote Observations

- ☒ HF Radar Sites

Of Special Note

- » U.S. Integrated Ocean Observing System: A Blueprint for Full Capability Ver 1.0 (pdf, Nov 2010)
- » Data Integration Framework (DIF) Final Assessment Report (pdf)
- » IOOS Regional Partners
 - * Annual Workshop
 - * Planning Document (pdf)
- » Federal Register Notices:
 - * U.S. Integrated Ocean Observing System Advisory Committee (pdf)
 - * Certification Standards for Non-Federal Assets (pdf)
- » ICOOS Act Progress Report
- » FY 2010 Regional Fact Sheets (pdf)
- » IOOS Response to Deepwater Horizon Oil Spill
- » NOAA's Deepwater Horizon Oil Response
- » IOOS Report to Congress (pdf)
- » National Surface Current Mapping Plan
- » National Operational Wave Observation Plan
- » IOOS Animal Telemetry Observations Workshop, Mar 2-3, 2011

U.S. IOOS®: Our Eyes on Our Oceans, Coasts, and Great Lakes.

Providing the data and information needed to improve safety, enhance our economy, and protect our environment.

The Integrated Ocean Observing System (IOOS®) is a federal, regional, and private-sector partnership working to enhance our ability to collect, deliver, and use ocean information. IOOS delivers the data and information needed to increase understanding of our oceans and coasts, so decision makers can take action to improve safety, enhance the economy, and protect the environment.

DATA CATALOG 	DATA MANAGEMENT <p>Data Integration Framework (DIF) Data Management and Communications (DMAC)</p>	COMMUNICATIONS <p>Press Room Calendar of Events Messaging Materials Brochures, Videos, Podcasts Z-grams</p>
REGIONAL PARTNERS 	INTERAGENCY PROGRAMS <p>Ocean Observatories Initiative Marine Protected Areas National Water Quality Monitoring Network</p> <p style="text-align: right;">more...</p>	GLOBAL OBSERVATIONS <p>Global Ocean Observing System Group on Earth Observations</p>



Logo-Land

With Scripps
(Dan Cayan)
have been slowly
working toward a

Coastal Climate
Data Archive

IOOS Catalog

[Help](#)

Service notice: We have found that Internet Explorer is slow to display this page, and we are investigating. Firefox, Safari and Chrome browsers work well.

1716 Platforms 79 Rectangles.

Variables:

☐ Cluster platforms

Click the dots for in-situ observations.

Click the rectangles for gridded data.

☒ Recent observations w/in:

☐ No observations

Filter By Date

Clear Date Filter

Start:

End:

Time is UTC. Start: 00:00 End: 23:59

Regions:

☐ Search by bounding box mode.

(Click a gridded data rectangle to filter platforms.)

Service types:

Servers:

Data Providers on this Server

All

Data Providers:

Data Products in overlapping rectangles:

Reset

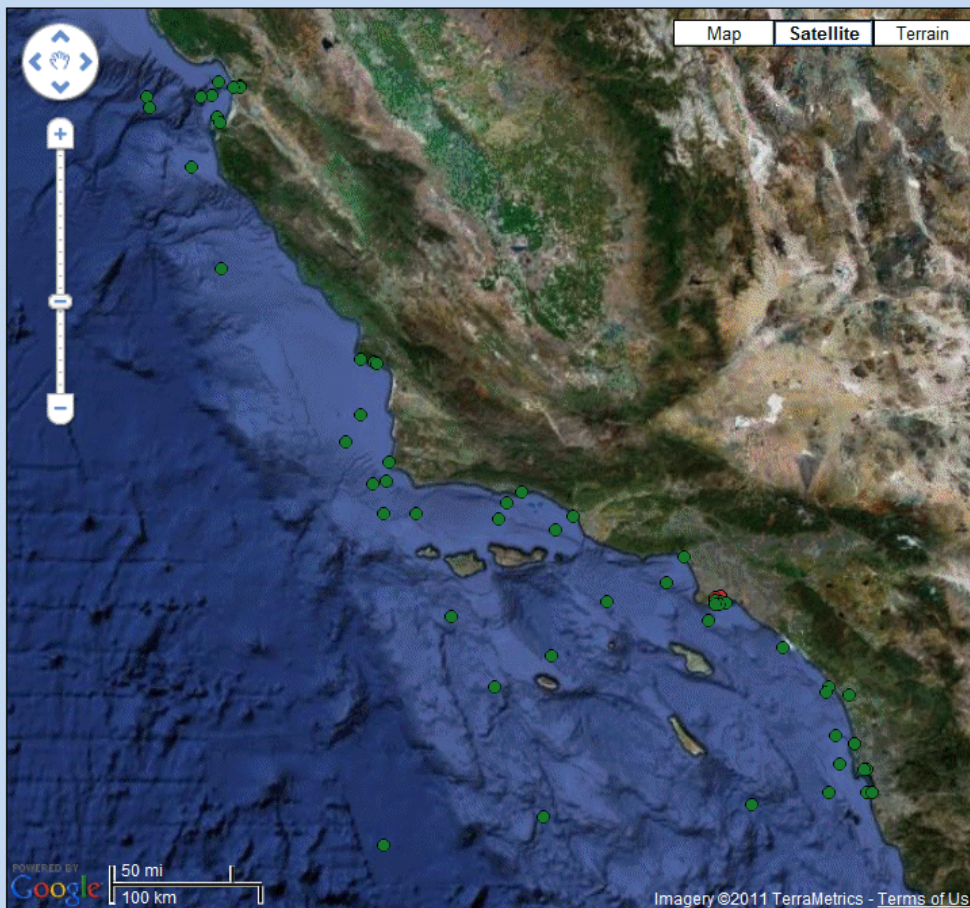
[Bookmark this view \(right click this link.\)](#)

[Documentation for IOOS gridded data services](#)

[Download all SOS Platforms \(XML\)](#)

[Download all TDS Rectangles \(XML\)](#)

Reload the page to refresh observations.





MEMORANDUM OF UNDERSTANDING
BETWEEN THE
U.S. DEPARTMENT OF THE INTERIOR
AND THE
U.S. DEPARTMENT OF COMMERCE
TO COORDINATE AND COOPERATE IN CLIMATE-RELATED ACTIVITIES
INVOLVING
SCIENCE, SERVICES, MITIGATION, ADAPTATION, EDUCATION, AND
COMMUNICATION

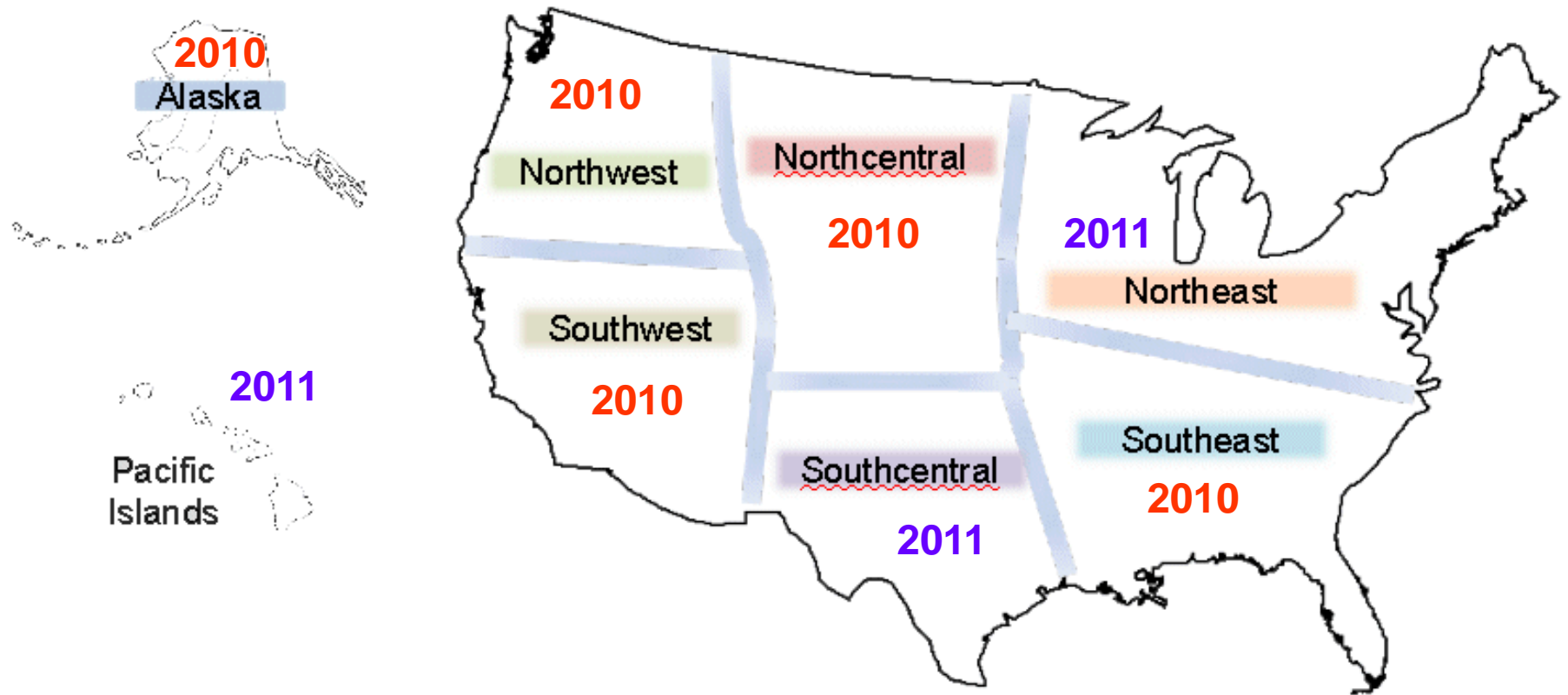
Article XI. Approval


U. S. Department of the Interior

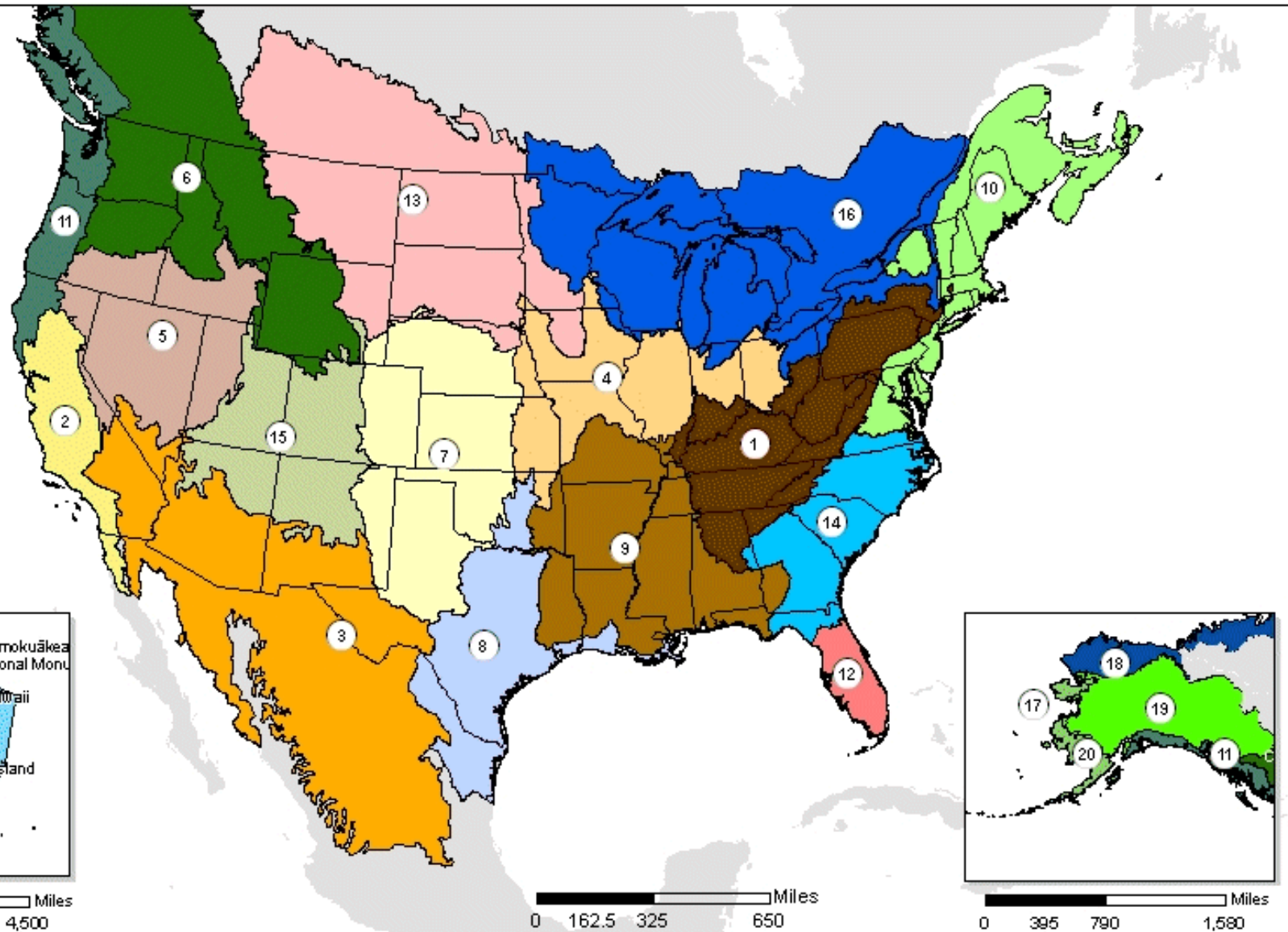

U. S. Department of Commerce

JUL 30 2010

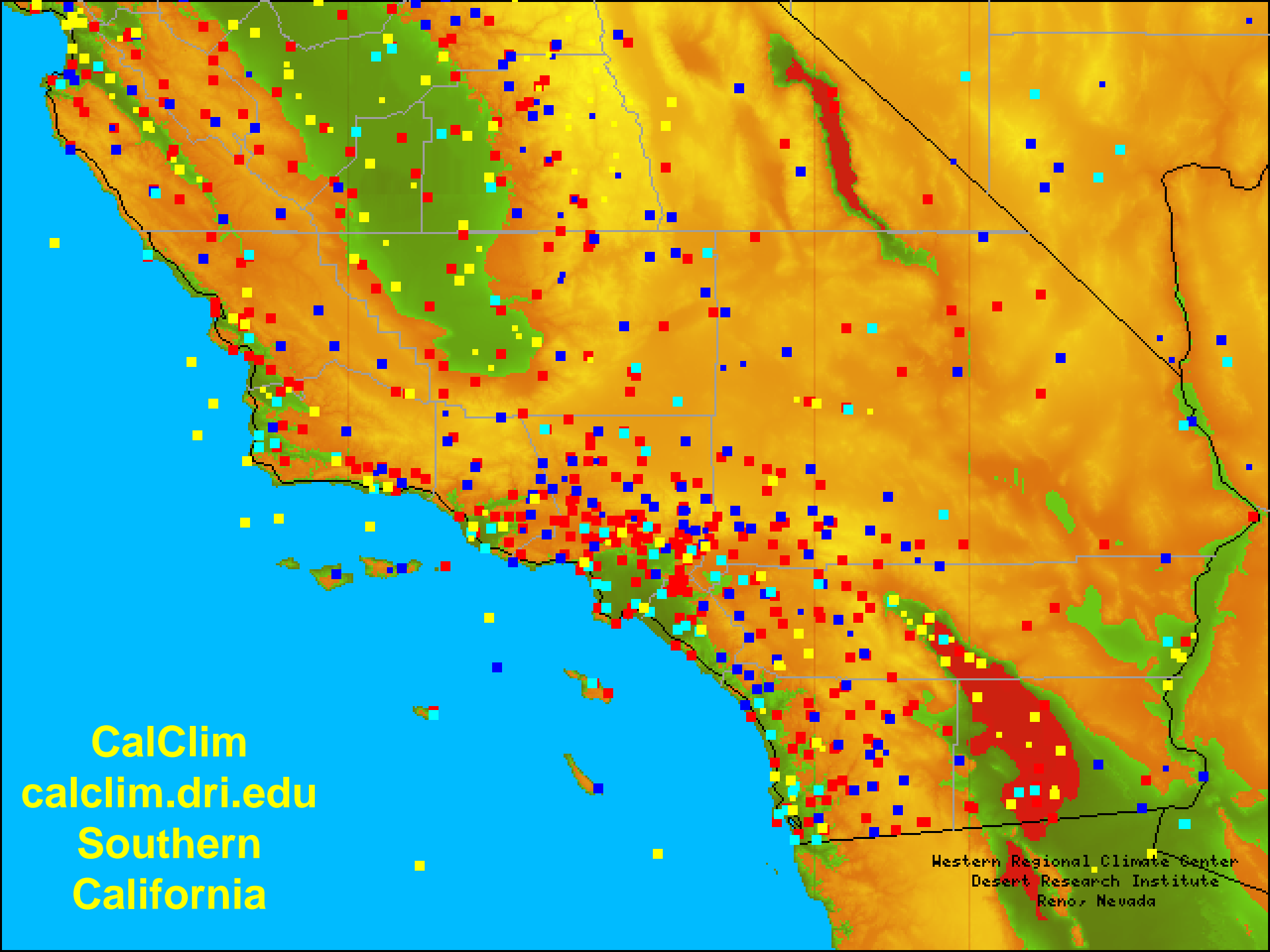
Department of Interior
Climate Science Centers
DOI includes USGS, NPS, FWS, BLM, BOR, BIA, others



- AK – UAF, UAA
- PNW – OSU, UWash, UIdaho
- SE – NCState, UNV, Duke, LSU, TexasTech, IowaStU
- SW – UAriz, UCDavis, Scripps, UCLA, UColo, DRI/WRCC
- NC – CSU, UM, MSU, UNL/HPRCC, UColo, CoSchoolMines, UWy, KSU, IowaSU



- | | | | |
|---|-----------------------------------|-------------------------------------|----------------------------------|
| 1. Appalachian | 7. Great Plains | 13. Plains and Prairie Potholes | 19. Northwestern Interior Forest |
| 2. California | 8. Gulf Coast Prairie | 14. South Atlantic | 20. Western Alaska |
| 3. Desert | 9. Gulf Coastal Plains and Ozarks | 15. Southern Rockies | 21. Pacific Islands |
| 4. Eastern Tallgrass Prairie and Big Rivers | 10. North Atlantic | 16. Upper Midwest and Great Lakes | Undclassified |
| 5. Great Basin | 11. North Pacific | 17. Aleutian and Bering Sea Islands | |
| 6. Great Northern | 12. Peninsular Florida | 18. Arctic | |



CalClim
calclim.dri.edu
Southern
California

Western Regional Climate Center
Desert Research Institute
Reno, Nevada

Summary Points 1/2

Large variety of data sources (very typical for a coastal environment)

Consistency through time is essential

- Exposure (vegetation, structures, ground cover)

- Observational methodology

- Overlaps between observational segments

- Don't move the stations

For long term monitoring

- A few very well maintained stations better than many less maintained

- Supplement with opportunistic short(-er) term process studies

Very strong horizontal and vertical climate gradients

- Need to sample each of these

- Vertical transects

- Horizontal transects

Precipitation is fairly well correlated among sites

- Big advantage (for measurement) - no snow at most elevations !

Other climate elements less well correlated

Summary Points 2/2

Need to be ready and capable to measure the biggest extremes

- A climate change issue**

- Ambiguous evidence of change in southern California**

Channel Islands

- Should have at least one climate station each island**

- Bigger islands low and high elevation sampling**

Long term consistent fog record(s) would be really helpful

- Proxy or direct or both**

Important to distinguish decadal scale variability from “change”

Drought

- Soil moisture a very good integrator**

- More point measurements**

- Model assistance is needed, cannot measure enough places**

- Drought indices tailored to ecological needs**

- Islands can get into drought difficulty fairly rapidly**

Thank You !



Santa Barbara Island RAWS Station

DISCARDS



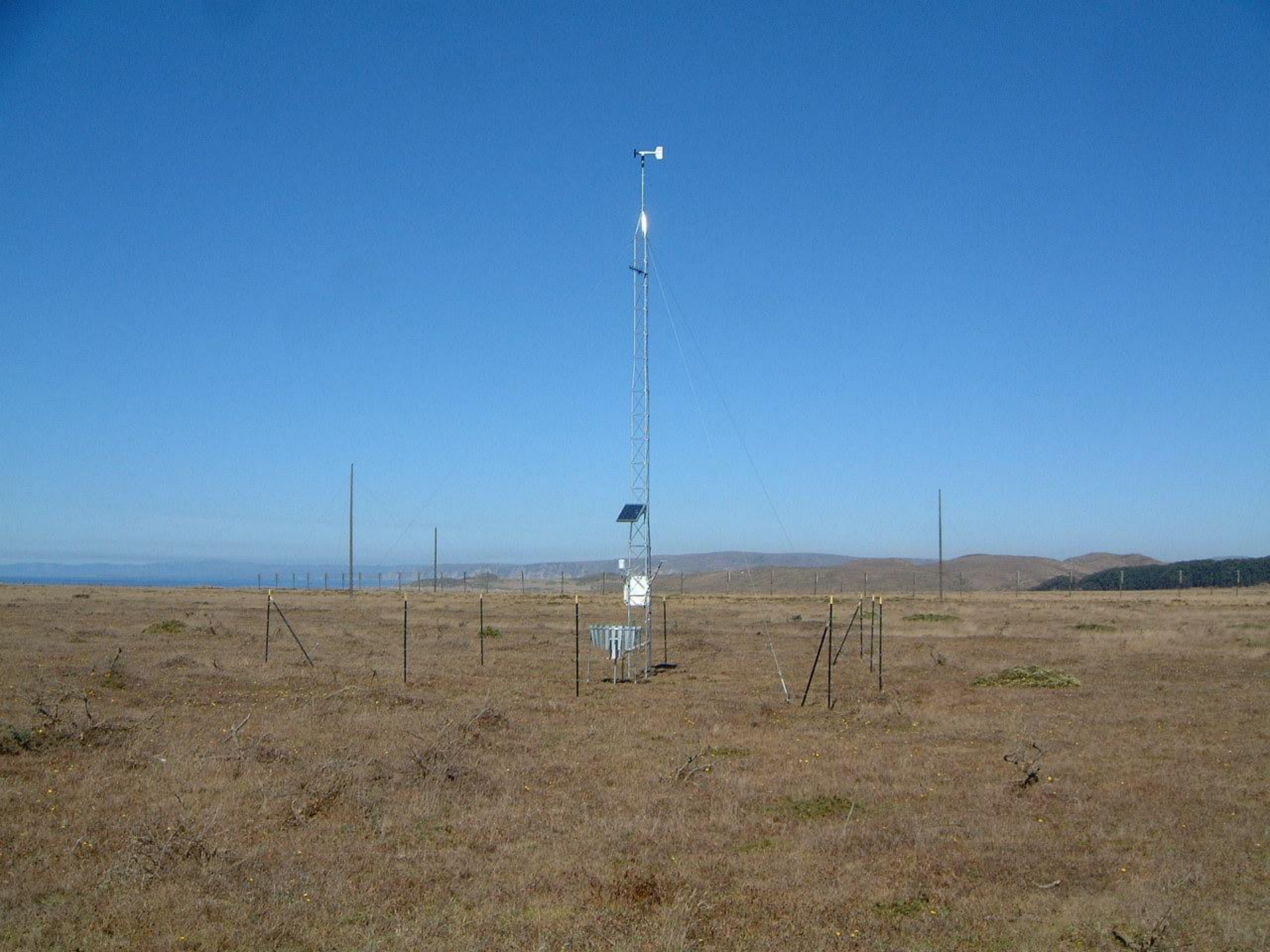


Antenna West and East sites.



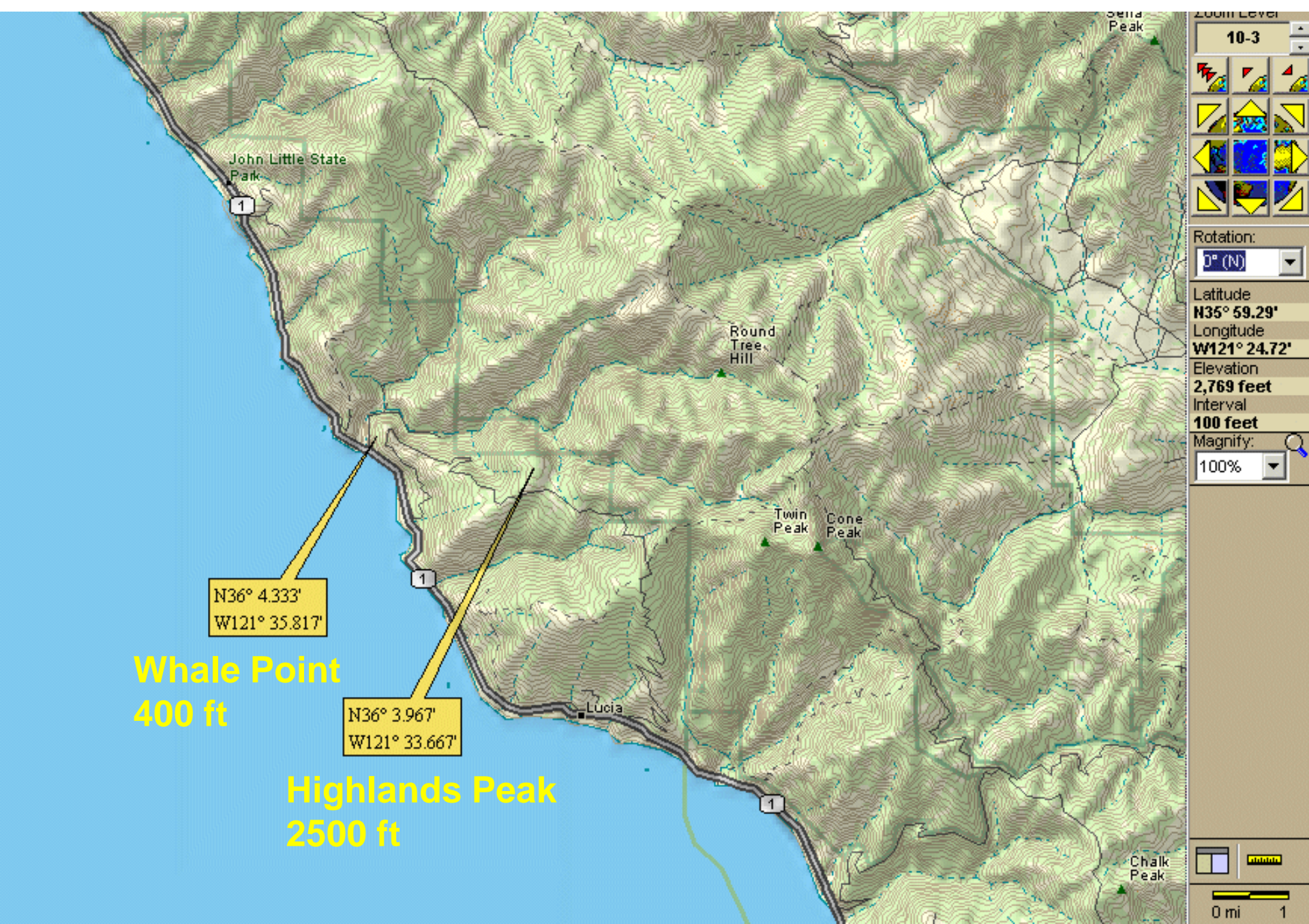
Antenna West and East sites.







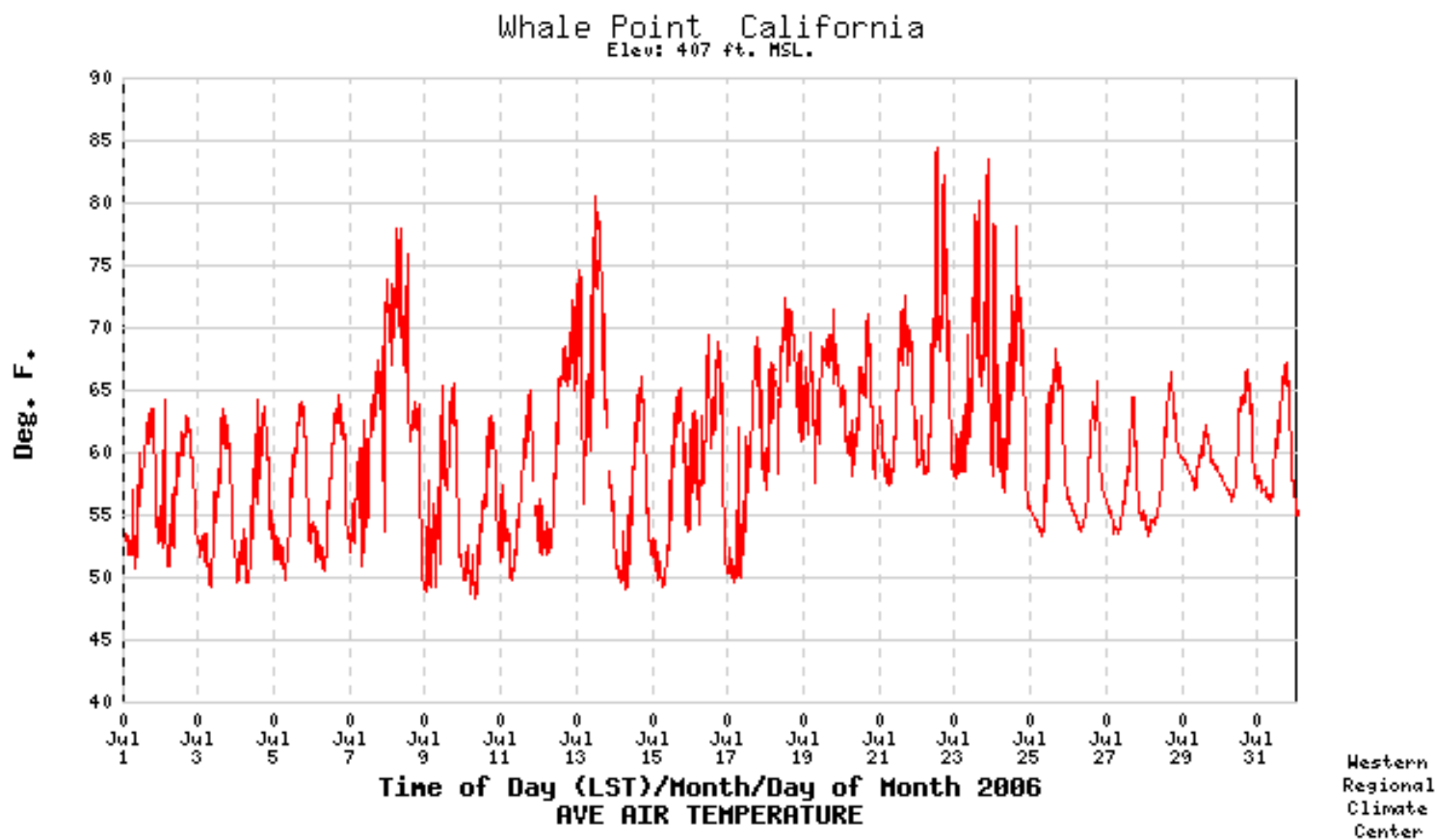
Whale Point (400 ft) and Highlands Peak (2500 ft), Big Sur. 2 miles apart.



Big Sur, Big Creek, Whale Point, 400 ft



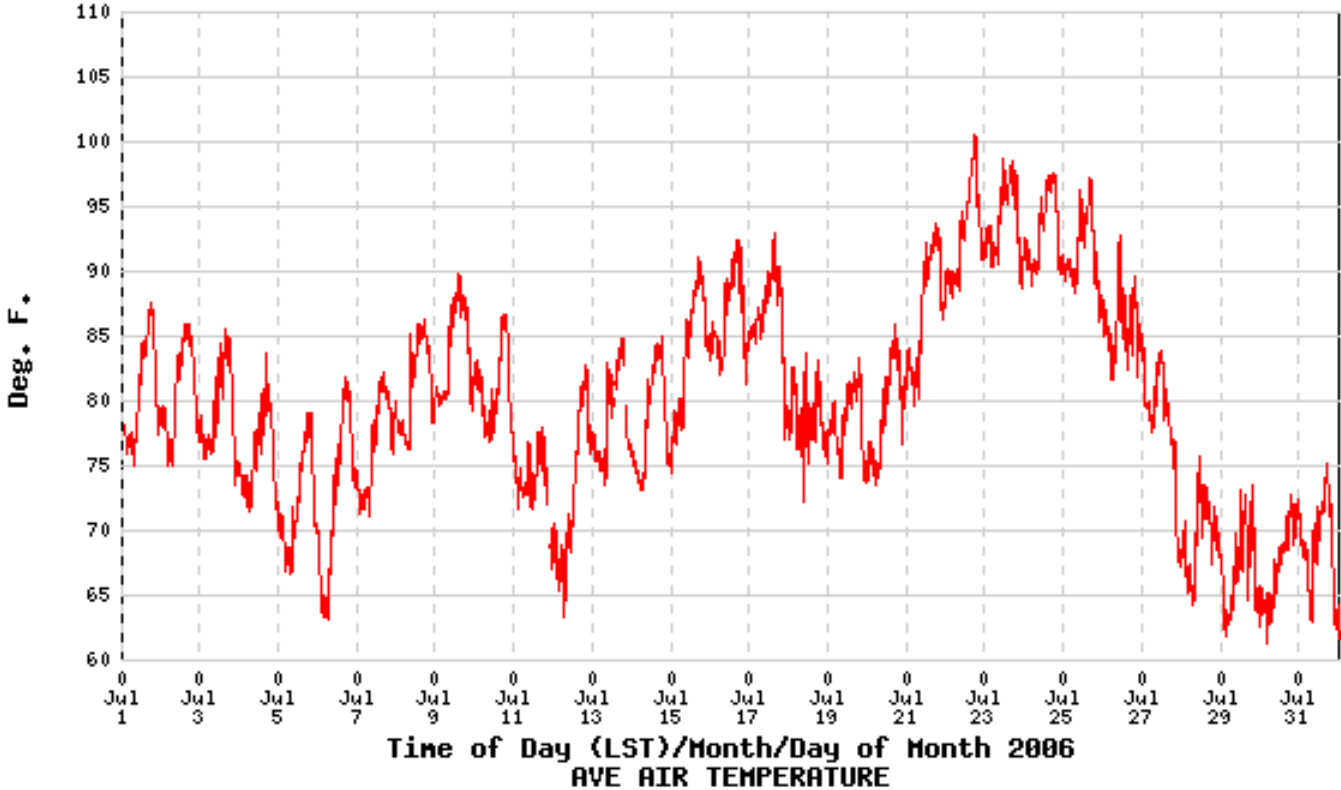
Whale Point, Big Sur, 400 ft, 10-min Temperature, July 2006 Heat Wave.



Statistics
Begin Date/Time
July 1, 2006
:00 LST
End Date/Time
July 31, 2006
23:50 LST
AVE AIR TEMPERATURE
Deg. F.
Average
59.8
Max. Min.
84.4 48.3

Highlands Pk, Big Sur, 2470 ft, 10-min Temperature, July 2006 Heat Wave.

Highlands Peak, California
Elev: 2470 ft. MSL.



Statistics

Begin Date/Time
July 1, 2006
:00 LST

End Date/Time
July 31, 2006
23:50 LST

AVE AIR TEMPERATURE
Deg. F.

Average
79.9

Max. | Min.
100.5 | 61.3

Western
Regional
Climate
Center